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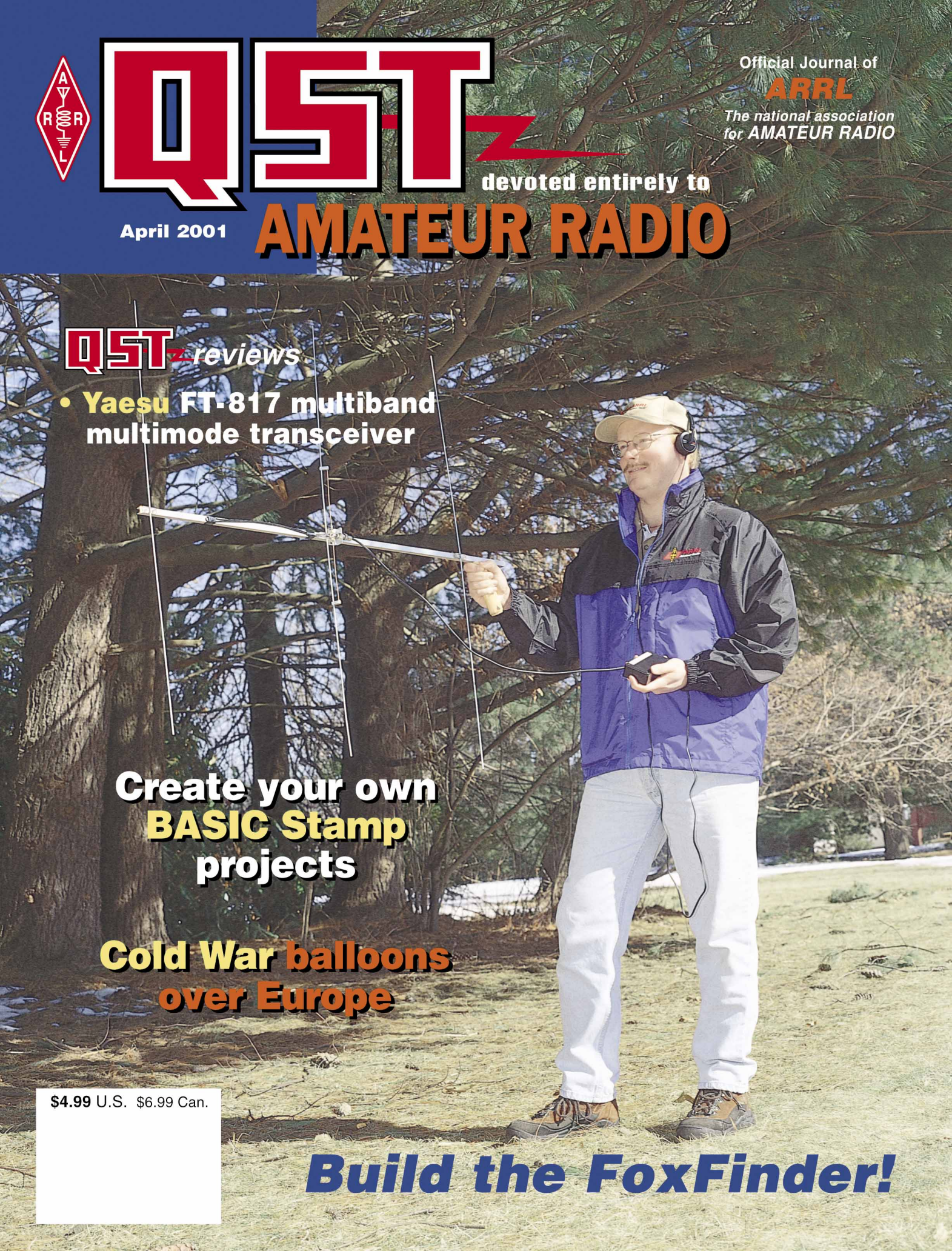
April 2001



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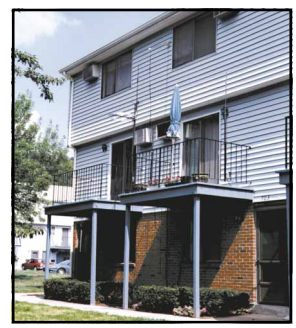

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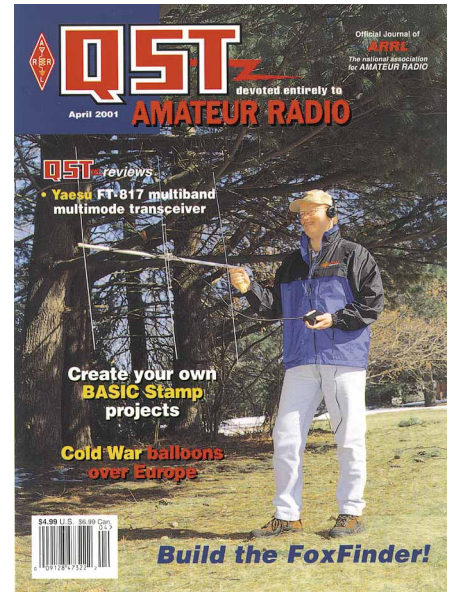

Our Cover:
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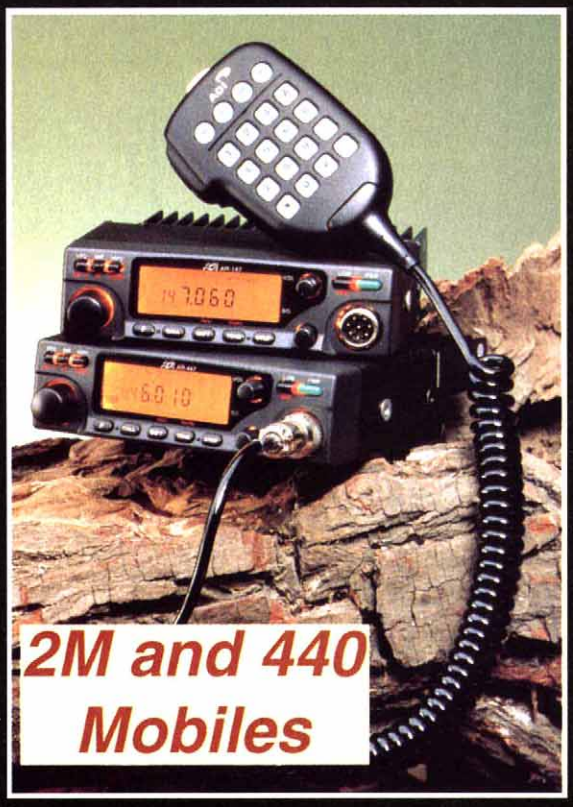

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Forty Meters: What's Happening?

If you're a regular reader of this page you may remember that last August we recounted how the 40-meter band got the way it is, with powerful broadcasting stations outside the Americas occupying the upper two-thirds of the band. We reported that realignment of the allocation is on the agenda of the 2003 World Radiocommunication Conference, WRC-2003. (To that we can now add that the conference is expected to take place in Caracas for four weeks beginning in early June of that year.) We briefly described the challenges facing the International Amateur Radio Union and its member-societies, including the ARRL, as we try to achieve the best possible WRC-2003 outcome for radio amateurs worldwide.

In the November 2000 editorial we took a closer look at the issue from the broadcasters' perspective, including their desire to introduce digital sound broadcasting below 30 MHz. We noted that the addition to the WRC-2003 agenda of an examination of the adequacy of the HF broadcasting allocations between 4 and 10 MHz makes it more difficult to solve the 40-meter problem, because it increases the pressure on the fixed and mobile services.

June 2003 is rapidly approaching and there is a lot to do between now and then. WRC-2003 has dozens of agenda items, most of them having to do with difficult technical subjects. Conferees are not simply going to show up in Caracas without preparation. A Conference Preparatory Meeting (CPM) will be held in December 2002 for the purpose of approving a technical report that will be a principal reference during the conference itself. Responsibility for the various sections of the CPM Report has been assigned and drafting is already underway, with a final deadline of May 31, 2002. The responsible groups are meeting this spring and fall, and next spring, to complete their work prior to the deadline.

In parallel, telecommunications administrations are working within their respective countries to prepare proposals and through their respective regional telecommunications organizations to develop support for what they hope will become regional "common proposals." Experience at recent conferences has shown that proposals fare better if they represent a consensus or near-consensus of the administrations in a part of the world. The reasoning seems to be, if you can't persuade your neighbors that you have a good idea, why should the rest of the world take your proposal seriously? The European Conference of Postal and Telecommunications Administrations (CEPT) is particularly active in this regard. The Asia-Pacific Telecommunity (APT) and our own Inter-American Telecommunication Commission (CITEL), among others, are also placing great emphasis on WRC-2003 preparations.

Where are the IARU and the ARRL in all of this? The short answer is, *everywhere*.

The ITU Radiocommunication Sector (ITU-R) has numerous Study Groups, Working Parties and Task Groups working on the CPM Report and other preparations. In cooperation with the ARRL and other member-societies, IARU volunteers are monitoring documents as they are distributed and are attending meetings as required.

For example, several of the issues of concern to the amateur and amateur-satellite services are assigned to ITU-R Working Party (WP) 8A, which also deals with the land mobile service (excluding IMT-2000). When this group met in Geneva last October, among the 60 attendees were several radio amateurs present in professional capacities. Three attended specifically to represent Amateur Radio: IARU President Larry Price, W4RA, representing the IARU; ARRL Technical Relations Manager Paul Rinaldo, W4RI, on the US delegation; and Ken Pulfer, VE3PU, of the Radio Amateurs of Canada, on his national delegation. Canada submitted a paper stating that it "supports the retention of the full 300 kHz allocation to the amateur services in Region 2 while reallocating part of the broadcast service in Regions 1 and 3 so as to restore the original amateur band to 300 kHz, exclusive and primary on a world wide basis." While this was simply the opening round of what promises to be a long and contentious process, it certainly got things off on the right foot.

Welcome as is Canada's support, it is one thing for an administration in Region 2 to recommend extending the Region 2 *status quo* to the rest of the world. It will be quite another for administrations in Regions 1 and 3, where the *status quo* for the amateur service is 100 kHz, to move toward restoring the 300-kHz exclusive amateur allocation. IARU volunteers are invited participants in the CEPT and APT preparatory processes and are working hard toward that objective, while in this hemisphere we are working through CITEL to cement the Region 2 position. It's an exciting, demanding process, and how it will turn out is still anyone's guess.

The process is not limited to WP 8A or to the 40-meter issue. WP 8A is also dealing with the review of Article S25, including but not limited to the Morse code requirement, as well as with the regulatory provisions for the formation of amateur call signs contained in Article S19. We are also involved in WP 6E, which is home to HF broadcasting's preparations; WPs 7C and 7E, where the advocates for an Earth exploration-satellite service allocation near 435 MHz will make their case; WP 8D, where Little LEO advocates are continuing their search for additional allocations below 1 GHz; and a couple of others. Each has its own schedule of meetings, including domestic preparatory activities.

There is a worldwide team working on your behalf under the banner of the IARU and its national member-societies. Except for ARRL staff and a very few others they are all volunteers, doing the job simply because it needs to be done. Other radio services may have deeper pockets; none has better or more deeply committed representatives.—*David Sumner, K1ZZ*

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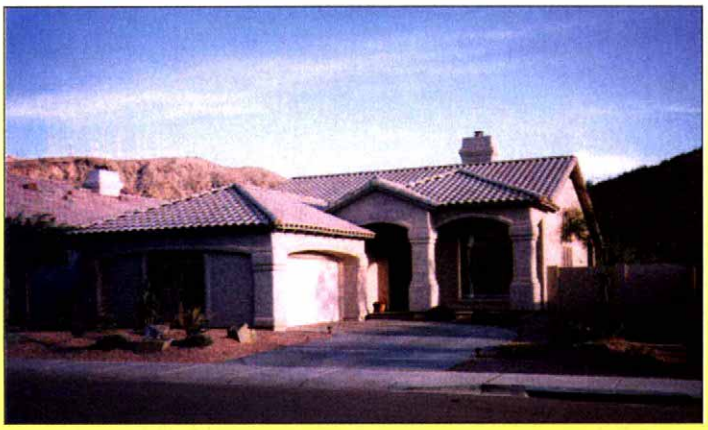

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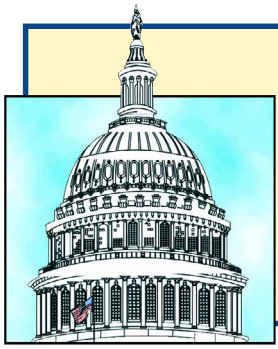

DC Currents

By Steve Mansfield, N1MZA
Manager, Legislative and Public Affairs

Just as radio waves aren't constrained by artificial boundaries, neither is ARRL's government relations effort. "DC Currents" covers behind-the-scenes activity you need to know about in Congress, at the FCC and other regulatory agencies, as well as at worldwide bodies such as the International Telecommunication Union.

Once Again, Congress Will Try to "Reform" the FCC

A bill introduced early in the 107th Congress by Representative Paul Gillmor (R-OH) would establish a seven member Congressional "commission" to study and report on the organizational structure and reauthorization of the Federal Communications Commission. Under the provisions of HR.646, the study commission will be composed of Representatives and Senators selected by US House and Senate leadership from both sides of the aisle. It will also include two former FCC commissioners. Gillmor is a longstanding member of the House Energy and Commerce Committee.

The avowed goal of several powerful members of Congress, such as Energy and Commerce Committee Chairman W.J. Billy Tauzin (R-LA-3rd), has been to "reform" the FCC, so the study commission is likely to get broad support when the members are named and the committee is able to commence its work. Federal agencies require periodic Congressional authorization in addition to appropriations. But technically speaking, the FCC has been a "non-authorized" agency since 1992, dependent for its congressional policy guidance on annual appropriations and other major legislation.

Representative Gillmor led a committee in the last Congress that attempted to "restructure" the commission. The House adjourned before that effort could be completed, although a report was filed with Telecommunications Subcommittee Chairman Tauzin. HR.646 contains a provision requiring a report on the findings and conclusions of the commission to be submitted to the Congress no later than six months after the bill is enacted.

The bill itself is expected to be non-controversial and likely to pass without much fuss. The "duties" of the commission are spelled out within it: for example, the commission is charged with considering not only whether the structure of the FCC should be changed "to reflect the current state of telecommunications, including the rise of the Internet," but also to consider whether or not to reduce the number of commissioners. There are currently five commissioners appointed by the President and confirmed by the Senate for five year terms. Only three may be of the same political party.

House Energy & Commerce Committee Reveals Ambitious Agenda

With its expanded jurisdiction, the House Energy and Commerce Committee has revealed a very ambitious oversight plan for telecommunications issues. The plan is posted on the Committee's Web site at **www.house.gov/commerce/oversight.htm**.

In addition to FCC restructuring and authorization, the committee will examine a range of mass media issues from television network election night coverage to violent content in media programming, and ways to help parents protect their children from such content. The committee will also look at the FCC's process for the transition of broadcasting from analog to digital, the impact of FCC rules governing the national broadcast ownership cap (and newspaper/broadcast station cross-ownership restrictions set by the Telecommunications Act of 1996) and the level of Federal funding necessary to sustain public broadcasting.

Internet issues the committee will look at are going to range from broad stroke topics such as causes and potential solutions to what the committee calls "the current economic malaise" affecting the e-commerce industry, the success and failure of specific high tech industries as well as a look at the barriers to the full deployment of broadband technologies being introduced nationwide. They also plan to examine narrower issues such as Federal government programs targeted at improving the use of technology in classrooms and by America's youth and the best way to combine funding for the programs into a single mechanism. Also on the agenda is a look at the Internet Corporation for Assigned Names and Numbers (ICANN), which governs the management and registration of generic top-level domain names. At the same time, they intend to examine threats to the Internet and other electronic communications networks, and whether law enforcement is sufficiently combating threats to the networks. The committee also plans to spend time considering whether the current agencies of the Federal government are properly coordinating with one another, and whether current law needs to be altered to deal with these issues. This will also include an examination of what steps the FCC itself takes to protect the integrity and security of its network systems and confidential data, and whether further efforts in this area are necessary.

Copyright issues are also likely to be visited, and the committee will consider whether new mechanisms are necessary to strike the proper balance between protecting works and encouraging the continued growth of the digital economy, particularly the recent explosion of Internet music-sharing products like Napster and similar emerging technologies for movies.

On the wireless front, the committee will look at spectrum management functions to ensure efficient use of spectrum, particularly by Federal government users, and review efforts to promote spectrum sharing that may be beneficial to the promotion of new wireless technologies. Also on the agenda is the conversion of analog-to-digital wireless services, including costs and technological needs of the law enforcement community with regard to the Communications Assistance for Law Enforcement Act (CALEA), including efforts to improve privacy protection of location information for wireless service users.

While the Senate Commerce Committee has not revealed its full agenda yet, in terms of overall issues it is likely to track closely with the House Commerce Committee.

CLARIFICATION

• In last month's "DC Currents," an article about state legislation was a little misleading to readers ("State Legislatures Still Top Heavy with 'Driving While Cellular' Bills"). Because the review of bills in state legislatures was done when many were just starting a new session, our list of legislation somehow overlapped to include both the previous session and the new session, and we failed to differentiate which was which. You're right, that was a mistake. We're sorry for any resulting confusion!

New Amateur Radio Tower Proposals in Four State Legislatures

Proposals to incorporate the limited federal preemption known as PRB-1 into state law have been introduced recently in four state legislatures—Indiana, Alaska, Nevada and Washington—with the help of the Amateur Radio community. Another bill that would have impeded the construction of ham towers and antennas in Texas was successfully amended through the effort of ARRL and Texas hams.

The four state-level PRB-1 bills would prohibit municipalities or counties from enacting rules that do not comply with PRB-1, the FCC's longstanding policy that requires local ordinances involving ham antennas "be crafted to reasonably accommodate amateur communications" and that such local ordinances "represent the minimum practicable regulation to accomplish the local authority's legitimate purpose."

The proposed Indiana laws, SB.331 and HB.1557, seek to prohibit communities from restricting Amateur Radio antennas to less than 75 feet above ground level, but would not prohibit them from taking action to "protect or preserve a historic or an architectural district." Bob Scott, K9YH, who's been tracking SB.331's progress, credits Jim Rodgers, K9KXQ, of Hobart, with drafting the bill and working with its sponsor to get it introduced.

ARRL Alaska Section Manager Kent Petty, KL5T, credits "the dedicated and tireless efforts" of Dan Squires, KD7WN, and Rob Wilson, AL7KK, as well as ARRL Northwestern Division Director Greg Milnes, W7OZ, with moving the Alaska bill, SB.78, forward. The bill would establish a three-tier height schedule that depends on the population density of the community in which the antenna is installed and the size of the lot on which it is sited. The minimum below which local authorities could not regulate would be 75 feet in areas with population densities more than 120 people per square mile. A height of 140 feet would prevail in areas with population densities of more than 120 people per square mile and a one acre or larger lot. The top-tier 200 feet limit would apply in areas where the population density is 120 people or less per square mile.

In Nevada, the Amateur Radio antenna bill was filed February 1 by assemblyman Bob Beers, WB7EHN. While the proposal conforms with most other "reasonable accommodation" language, it would not apply to historic or architectural preservation districts. In a nice twist, it would make "void and unenforceable" any provision in a deed covenant, restriction or condition (CC&R) that "precludes amateur service communications" or "unreasonably restricts the placement, screening or height of a station antenna structure" that might significantly decrease antenna performance or that does not allow for the use of an alternative station antenna "at a comparable cost and with comparable efficiency and performance." The bill's provisions would not apply to CC&Rs in Nevada already "executed and recorded" at the time the bill goes into effect.

Washington State lawmakers have introduced SB.5002 to strengthen that state's PRB-1 law enacted in 1994. The proposal specifies that local governing bodies could not restrict Amateur Radio antenna height to less than 70 feet without a clearly defined health, safety, or aesthetic reason. The bill was promoted by George B. Hutchison, W7KSJ, through an organization called "Hamtowerlaw" (**www.hamtowerlaw.com**).

In Texas recently, hams were working to keep something *out* of the law, rather than to get something *in*. At issue was HB.1148, aimed at regulating antenna construction, height, lighting and location for commercial antenna installations, which inadvertently would have imposed restrictive reporting and paperwork requirements on even the most basic ham installation.

As a result of intervention from the ARRL, Texas House of Representatives member Robert Cook agreed to amend the proposal to include a new section that excludes Amateur Radio. The new section, 240.082.5 EXCLUSIONS, reads: "Nothing herein shall be construed to regulate, nor shall it regulate, antennas, antenna support structures, devices or facilities, installed, maintained and used exclusively for Amateur Radio communications by Amateur Radio operators licensed by the Federal Communications Commission." Another proposal in the Texas House, HB.1492, would require all towers taller than 50 feet to be painted and marked in accordance with aviation safety regulations. In response to e-mail invited by ARRL President Jim Haynie, W5JBP, the bill's sponsor, State Rep Rick Hardcastle, told Haynie, "Ham operators will be exempted from HB.1492."

For more information on PRB-1 and Amateur Radio antenna regulation, visit ARRLWeb at **www.arrl.org/FandES/field/regulations/#local**.

Media Hits

- The Norfolk *Virginian-Pilot* reported that a group of students from Kecoughtan High School got the opportunity to talk from the Virginia Air and Space Center with US astronauts aboard the International Space Station. In addition to a number of students, also mentioned in the article were ham operators Wally Carter, K4OGT, and Ken Pierpont, KF4OW. The QSOs were successful!
- Jules Hebert's call sign could not have been much larger and still fit into the headlines of an article in the *Beaumont* (Texas) *Enterprise*. In an article under the headline of "Call Sign KD5JKE" in approximately 90 point type, Hebert's involvement with Amateur Radio is chronicled from about a year ago when he took a license course from an old friend. The article is particularly enthusiastic about the emergency communication capability of Amateur Radio.
- When the Melvin J. Berman Hebrew Academy's Amateur Radio Club got on the air for the first time in Rockville, Maryland, the activity of founders Gary Cohen, WA2CES, Abe Schachter, N3BBF, and Marc Pressman, N4DR, were covered by the *Rockville Gazette* in an article that focused both on the fun of hamming but also on the emergency communications activities that benefit the community.
- The *Daily News Journal* of Murfreesboro, Tennessee, lauded Amateur Radio's emergency communications capabilities locally, nationally and even internationally, in an article that featured interviews with Chuck Mills, K4CM, of Lacassas and Jay Zmudzinski, KE4NYH, of Auburntown. The article features a nice color photo of Mills in his shack and standing in front of his 165-foot tower.
- The Seneca Radio Club got a real boost from an article in *the News-Messenger* of Fremont, Ohio, that not only extolled the virtues of Amateur Radio and what enthusiasts do with it, but also publicized the availability of classes being offered by the club. According to club member Ken Dumminger, N8VWZ, the article drew in at least 15 potential hams who were interested in taking the classes.
- An article in the *Birmingham* (Alabama) *Post Herald* informs the reader that "Radio 'hams' protect, serve community," and provides plenty of evidence that such a statement is true. The article, which focuses on the emergency communication activities of the Tuscaloosa Amateur Radio Club and the Birmingham Amateur Radio Club mentions many local hams including Brian Peters, WD4EPR, Rosalind Fazel, KD4ZGO, Mike Miller, N4VG, Cal Davis, KF4LAR, Randy Kelling, W4KI, Steven Moss, KB4FKN, Dave Cisco, W4AXL, Ellis Dobbins, K4LI and Ed Pitchford, KD4AY. Thanks to Randy Kelling, W4KI for the heads-up.

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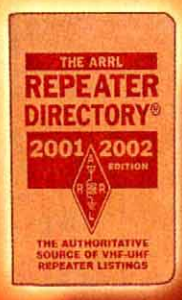

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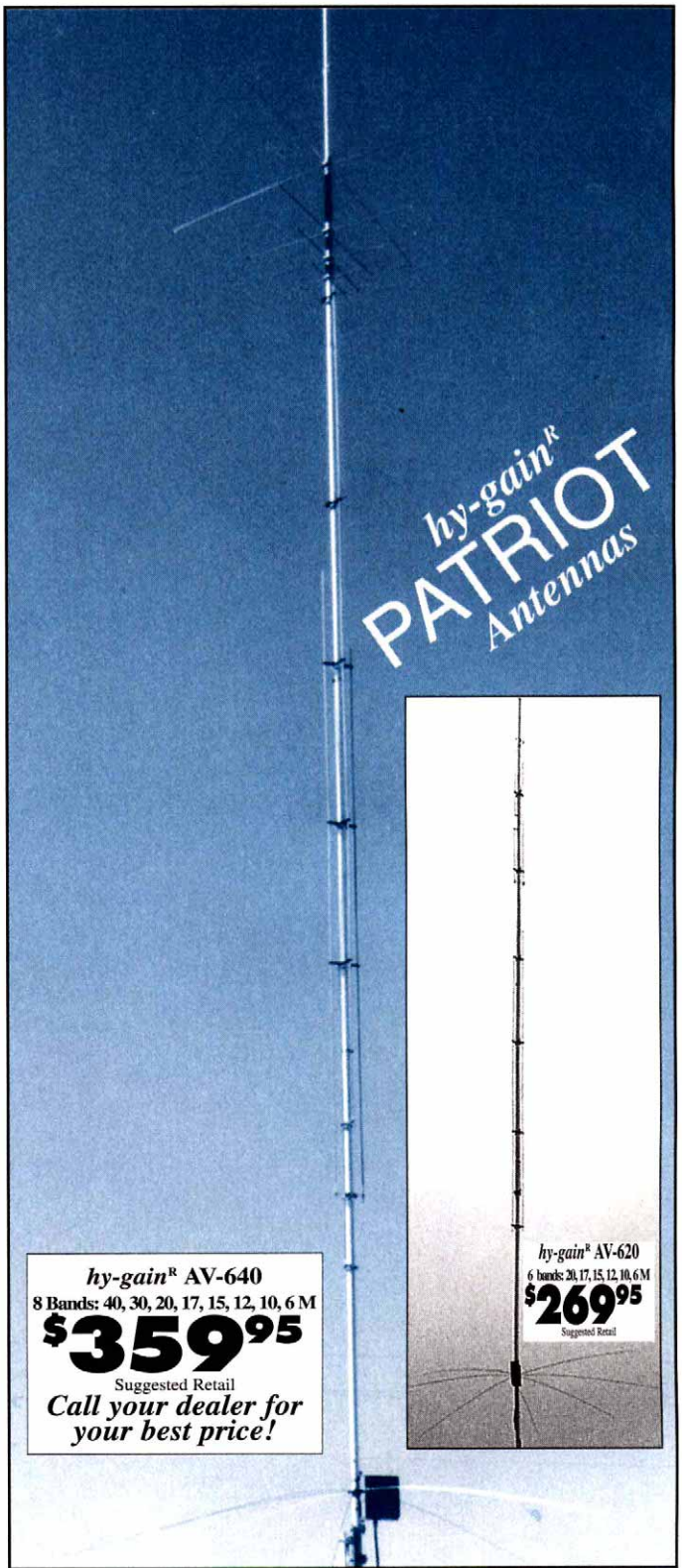


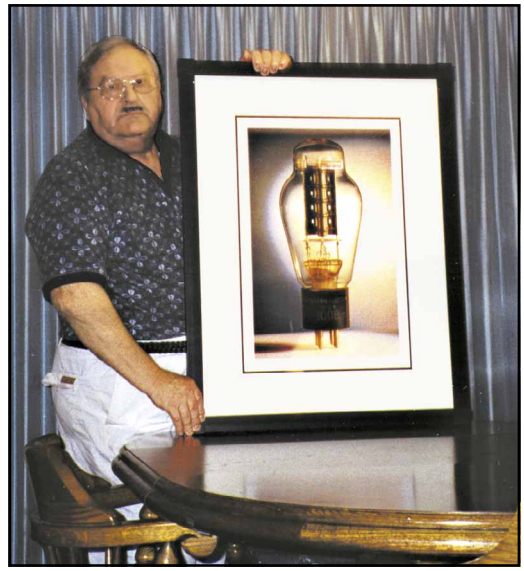
Specifications	AV-620	AV-640
Bands covered (meters)	6,10,12, 15,17,20	6,10,12,15, 17,20,30,40
2:1 VSWR Bandwidth (KHz)		
40M	N/A	150
30M	N/A	175
20M	500	500
17M	500	500
15M	500	500
12M	500	500
10M	1500	1500
6M	2000	1500
VSWR at resonance (typical)	1.5:1	1.5:1
Power handling (watts output) key down 2 minutes	1500	1500
Vertical radiation angle (degrees)	17	17
Horizontal radiation angle (degrees)	360	360
Height (feet)	22.5	25.5
Weight (pounds)	10.5	17.5
Wind surface area (square feet)	2.4	2.5
Wind survival (mph)	80	80

A classy cabinet! You're looking at the compact HF station of Jeff Weisberger, N2QLV, in Toledo, Ohio. The custom hardwood safari trunk was built by a New Jersey cabinetmaker and it sports brass fittings and carry handles. Jeff assembled the station around his ICOM IC-735 transceiver, adding a power supply, antenna tuner and speaker. When this photo was taken, the portable station was set up on infant son Alex's play table, to permit some 10-meter DX chasing during Alex's naps!

You don't see these very often. Norberto Wente, LU1VD, sent this photograph of a 20- through 6-meter discone antenna crafted by the Radio Club Bariloche in Rio Negro, Argentina for use during their National Emergency Test. The skirt of the antenna is made of 40 wires, each about 15 feet long.

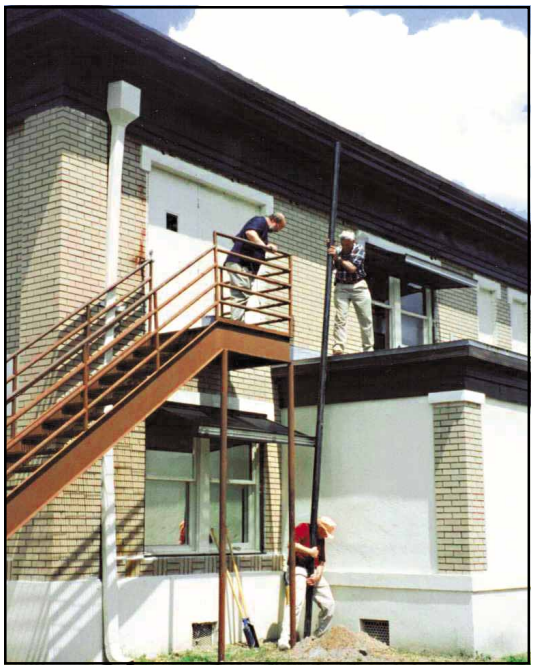
STAN REIMER

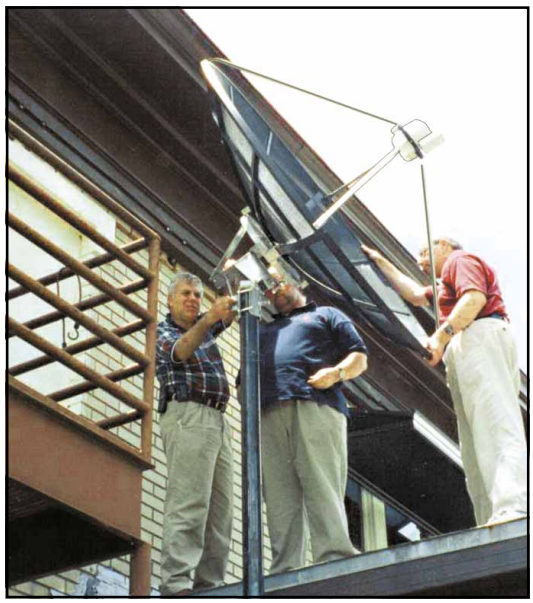
Hams in high places. Heather Hollenbeck, KB0MDX, has become an intern to Kansas Lieutenant Governor Gary Sherrer. Heather is a Washburn University junior majoring in elementary education.



Some people prefer framed works of Picasso or Monet. Don Christensen, W8WOJ, is a patron of a different type of art—in this case a photograph of a Western Electric 300A vacuum tube. Jodi Dole, a professional photographer in New York City, took the photograph. Don's son had the image enlarged and framed as a Christmas gift for his father.

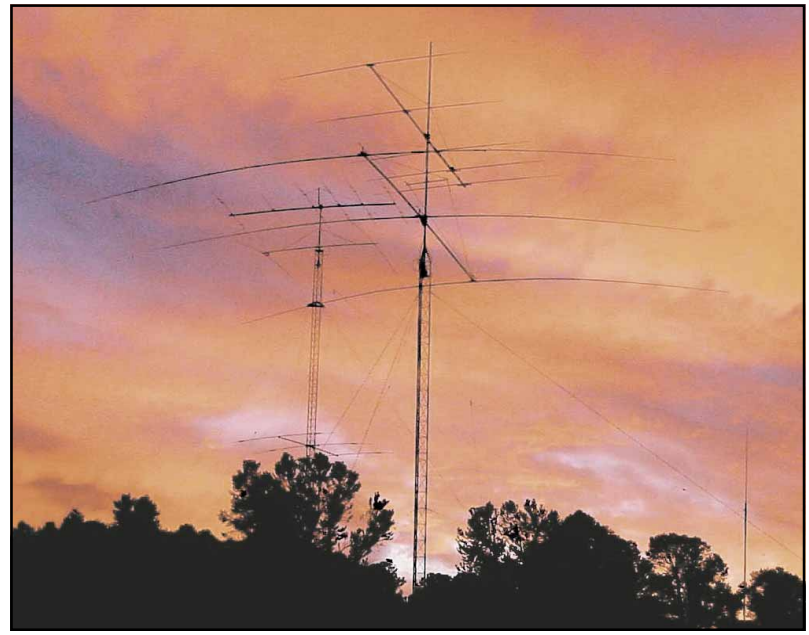
Parrot repair. David Riley, VK2AYD, of Wauchope, Australia has a prized Yagi antenna that is frequently a victim of the local parrot population. (They enjoy stripping the insulation from the coaxial cable and the traps.) This year he decided it was time for a top-to-bottom renovation—and hired a "cherry picker" for the job.



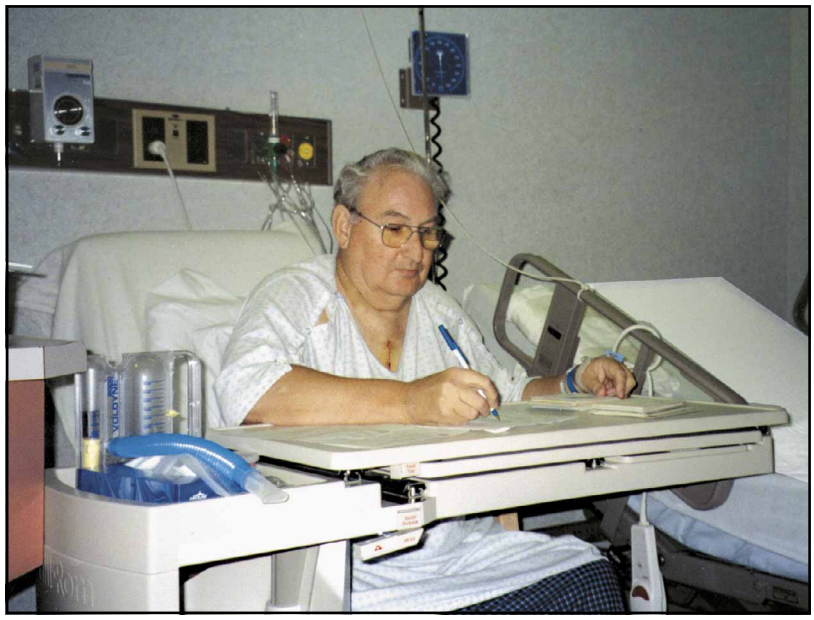


The call goes out—and hams answer. Ty DeJesus, the Hardee County (Florida) Emergency Management Director, needed help installing and maintaining an Emergency Managers Weathers Information Network facility in his area. He approached John Fleming, WD4FFX, at the Florida Division of Emergency Management, who suggested that Amateur Radio operators would be ready and able to help. John put out the call and it was answered by a team consisting of Jack Belich, WB4PBF, West Central Florida Assistant Emergency Coordinator; Paul Toth, NA4AR, West Central Florida Assistant Section Manager; Darrell Davis, KT4WX, West Central Florida Technical Coordinator, Dave Amburst, AE4MR, West Central Florida Section Manager; Clyde Barringer, KF4LEA, and David Barringer, KF4LEB. In these photos the team is shown erecting a satellite antenna for the facility. The system is now up and running, thanks to dedicated amateurs!

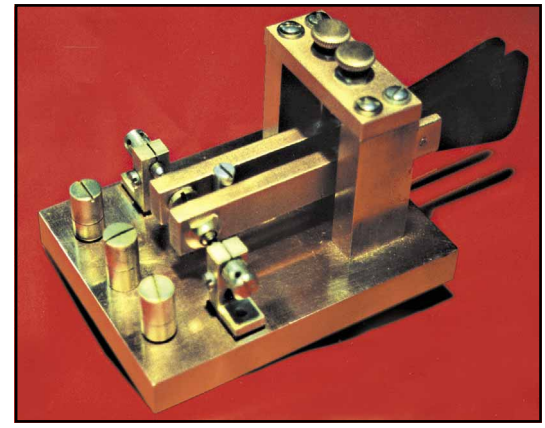
Satellite show and tell. Michaela Cui, KB1FRU, decided to give her 5th-grade classmates at Barrington Elementary School in Barrington, New Hampshire a "show and tell" they wouldn't forget. With the help of her father, Dan Cui, K1CUI, she set up satellite-tracking software on a laptop computer and quizzed the class about the countries the UoSAT-OSCAR 14 satellite passed over that day. When the FM repeater satellite came overhead, they all went outside to make contacts through the bird. (According to Dan, they created quite a pileup.)



There is something beautiful about an antenna farm at sunset. This is the station of Tom Taormina, K5RC, in Virginia City, Nevada. *National Contest Journal* editor Dennis Motschenbacher, K7BV (left), operated from K5RC during the 2000 ARRL Sweepstakes.



There is dedication…and then there is *real dedication!* Bill Dodge, K1BD, is checking VUCC cards for Fred Allstadt, N1ZUK, while still in the hospital just days after undergoing quintuple heart bypass surgery! Bill is a member of the Great Bay Radio Club and was a New England Division Volunteer of the Year in 1994. We can see why!



This iambic key is a beauty! Fred Kilburn, W2VUF, made the three-pound key from 1/2-inch copper stock using only hand tools. (Even the holes were drilled and tapped by hand.)

JOE BOTTIGLIERI, AA1GW

This has to be one of the most unusual code-practice "oscillators" on the planet! This thoroughly tongue-in-cheek device is the PQP—Practice Quarter Pounder—designed and built by Charlie Gould, K4VC.

You have to live somewhere…so why not live in Radioville? George Weber, KA0BSA, spotted this appropriate ham destination while driving through northern Indiana.

Greetings from Bouvet Island. These photos of Bouvet Island from Chuck Brady, N4BQW, give you a sense of the cold desolation he and the team of South African scientists encountered early this year. While on the island, Chuck operated as 3Y0C, making this rare DXCC entity available for thousands of amateurs.

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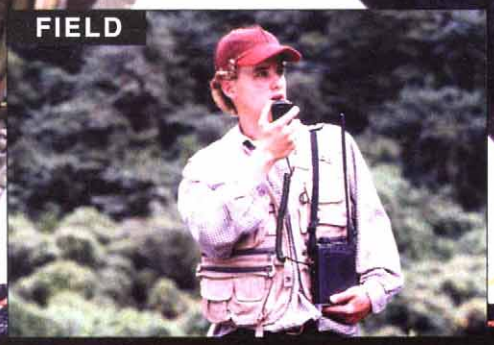
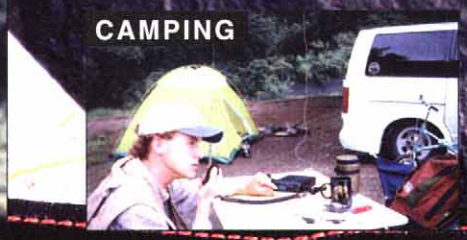
Ham Radio in the Great Outdoors: It's the Best with Yaesu's FT-817!





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Bring Ham Radio along on your next hiking, camping, or business trip with Yaesu's amazing new FT-817 Multimode HF/ VHF/ UHF Portable Transceiver!

- **ULTRA COMPACT:** Measuring just 5.3"x 1.5"x 6.5" WHD (135 x 38 x 165 mm) and weighing about 2 1/2 pounds (1.17 kg, including the supplied antenna and alkaline cells), the FT-817 is small and light enough to take along wherever you're going.
- **WIDE FREQUENCY COVERAGE:** 160-10 meters on HF, plus the 50, 144, and 430 MHz Amateur bands. Plus FM Broadcast, AM Aircraft, and Public Safety receiver coverage.
- **MULTIMODE DESIGN:** Ready for action on SSB, CW, AM, FM, FM-Wide (Rx), 1200/9600 bps Packet, and Digital, including dedicated USB and LSB PSK-31 configurations.
- **5 WATTS POWER OUTPUT:** Using a new-technology all-band MOS FET power amplifier, the FT-817 provides 5 Watts of power output when using a 13.8 Volt DC source. When using Alkaline batteries or the optional FNB-72 Ni-Cd Battery Pack, power is automatically set to 2.5 Watts;via Menu, this can be changed to 0.5 Watt, 1 Watt, or up to 5 Watts.
- **WIDE CHOICE OF POWER SOURCES:** The FT-817 is equipped with an alkaline "AA" cell battery case, and a 13.8 volt DC cable is also supplied. Available as an option is the FNB-72 Ni-Cd Battery Pack (9.6 V, 1000 mAh), which can be recharged using a 13.8 Volt power supply while the radio is being operated.
- **TWO ANTENNA PORTS:** A "BNC" connector is provided on the front panel, and a type "M" connector on the rear panel, with Menu selection of which connector will be assigned for operation on HF, 50 MHz, 144 MHz, and 430 MHz.
- **OPTIONAL COLLINS® MECHANICAL FILTERS:** An optional filter slot is provided, accommodating either the YF-122S (2.3 kHz) 10-pole SSB filter or the YF-122C(500 Hz) 7-pole CW filter. You get "base station" performance even from a mountain top.
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Today's elite-class operators demand the best RF weaponry available. Yaesu's exciting new MARK-V FT-1000MP answers the call, with an expanded array of receiver filtering, 200 Watts of power output, and Class-A SSB operation capability for the cleanest signal on the band. Enhanced front-panel ergonomics on the front panel save you seconds in a pile-up or a contest "run," and Yaesu's HF design and manufacturing know-how ensures that no short-cuts have been taken in our effort to bring you the best HF transceiver money can buy. For more QSOs in your log, and more awards on your wall, there is only one choice: the MARK-V FT-1000MP from Yaesu!

I. Interlocked Digital Bandwidth Tracking System (IDBT)

The IDBT feature greatly simplifies SSB operation by matching the bandwidth of the DSP (Digital Signal Processing) system to the net bandwidth of the 8.2 MHz and 455 kHz IF stages. The IDBT system accounts for the settings of the IF WIDTH and SHIFT controls, and automatically sets a DSP bandwidth which matches the analog IF bandwidth.

IDBT: A Breakthrough in Selectivity!

II. Variable RF Front-End Filter (VRF)

Protecting the MARK-V's receiver components from strong out-of-band signals, the VRF system acts as a high-Q "Preselector," located between the antenna and the main bandpass filter networks, providing additional RF selectivity on the 160-20 meter Amateur bands for multi-operator contest teams, DX-peditions, or for operation near MW/SW broadcast stations.

VRF Features Large High-Q Coils and High-Quality Relays

VRF Typical Bandpass Response (3.5 MHz)

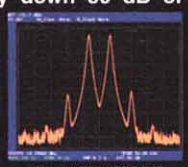
III. 200 Watts of Transmitter Power Output

Utilizing two Philips® BLF147 Power MOSFETs in a 30-Volt, push-pull configuration, the MARK-V's transmitter puts out up to 200 Watts of clean output power, thanks to the conservative design of the PA section.

T-Configuration Heat Sink

IV. Class-A SSB Operation

Exclusively available on the MARK-V FT-1000MP, a press of a front-panel button engages Class-A SSB operation of the transmitter, at a power output level of 75 Watts. Class-A operation produces incredibly clean signal quality, with 3rd-order IMD typically suppressed 50 dB or more, and 5th- and higher-order products typically down 80 dB or more!



Class A 75 W PEP IMD

V. Multi-Function Shuttle Jog Tuning/ Control Ring

The immensely-popular Shuttle Jog tuning ring, which is concentric with the Main Tuning Knob, has a new look in the MARK-V: it now includes the activation switches for the VRF (left side) and IDBT (right side) features, so you don't have to move your hand position to activate these important circuits during contest or pile-up situations!

Access VRF and IDBT Features via Shuttle Jog Dial

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■Frequency Coverage: (RX) 100 kHz–30 MHz; (TX)160–10 m Amateur Bands ■Dual In-band Receive w/Separate "S" Meters ■Ten Pole Collins® Mechanical Filter Built-in ■RX DSP Noise Reduction and CW Peaking Filter ■High-speed Automatic Antenna Tuner ■Two TX/RX Antenna Jacks plus RX-only Jack ■TX Microphone Equalizer ■RF Speech Processor ■Direct Digital Synthesis ■CW Spot and Two Key Jacks ■Two Headphone Jacks (1/4" and 3.5 mm) ■Low-Level Transverter RF Drive Jack ■Separate FP-29 Power Supply (30 V/13.8 V DC Output)

Photo shows optional MD-100A8X Deluxe Desk Microphone

HF 200 W All-Mode Transceiver

MARK-V FT-1000MP

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- 50 MHz Transverter with 200 W PEP Power Output
- Class-A Bias Selection for Low TX IMD (PO: 50 W)
- High-Performance Receiver Front End
- Automatic, Effortless Operation with MARK-V FT-1000MP
- Upgrade to High Power with VL-1000 Linear Amplifier

Specifications

Frequency Range:	50-54 MHz
Antenna Impedance:	50 Ohms
Power Output:	200 Watts PEP
Spurious Emissions:	At least 60 dB down
Power Source:	DC 30 V and 13.8 V (supplied by FP-29 Power Supply of MARK-V)
Dimensions:	9.6" x 5.4" x 13" WHD (243.5 x 136.5 x 331 mm)

FTV-1000

200 W 50 MHz Transverter

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CORRESPONDENCE

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We read every letter received, but we can only publish a few each month. We reserve the right to edit your letter for clarity, and to fit the available page space. Of course, the publishers of *QST* assume no responsibility for statements made by correspondents.

QSL RESEARCH

♦ In my volunteer duties as the incoming 8-land QSL bureau sorter, I accumulated a number of cards from people who did not send in envelopes to claim them, despite occasional attempts to contact them. I recently resolved to take care of every last such card, one way or another. In doing so, some interesting facts were revealed about hams in general that you may find interesting.

There were initially unclaimed cards on hand for 399 hams. But only 164, or 41% of these, are listed in the current call sign database at QRZ.com. Perhaps the others are no longer licensed, deceased, have changed calls and the change is not listed, or the call sign written on the QSL card is wrong.

All 399 of these calls were listed on the ARRL 8th District QSL bureau Web pages as "You have cards waiting," but only about three hams have noticed and contacted me from that source.

Forty-seven of the 164 listed (or 29%) had e-mail addresses on file with QRZ.com, so I sent them e-mail. Forty-three percent of these did not reply. Possible reasons are lack of interest in their cards, or they felt the cards had their call signs on them by mistake, or the call was being pirated.

Fifteen percent of my e-mails bounced back, indicating the addresses the recipients had placed on file with QRZ.com is now incorrect.

Thirteen percent replied to my e-mails, but then did not follow up by sending in envelopes to get their cards.

Twenty-six percent sent in envelopes to get their cards.

Three percent were miscellaneous cases.

For the remaining 115 hams that did not have e-mail addresses list, I sent postcards. Fifty-seven percent did not reply, probably for the same reasons as above. Thirteen percent of the postcards were returned by the post office as undeliverable. This is troubling, since hams are *required* to have their current address on file with the FCC (which is where the QRZ.com information ultimately comes from).

Twenty-nine percent sent envelopes to get their cards.

One percent were miscellaneous cases.

The bottom line is obvious. All hams who work DX (even just a few contacts per year) *must* keep envelopes on file at local incoming QSL bureaus. Whether you like it or not, DX stations will send QSLs to you via the bureau, and volunteers like me will get stuck with trying to contact you about your cards. As you can see from the statistics above, this effort is not terribly fruitful.

It would be extremely helpful if a *historical* call sign database existed on-line that had the complete history of every call sign ever issued. I know it is possible to pay someone now to search the history of individual call signs, but that is impractical for most purposes. I urge the ARRL to take this on as a project and do it now. It is difficult, but it only has to be done once, and then it is easy to keep the information up-to-date thereafter. There are many applications for such a historical call sign database beyond the obvious use in QSLing: locating old friends, finding out who held your call sign previously, finding out if a call sign has ever been issued, etc. This is an important part of the history and heritage of ham radio, and it needs to be fully documented.—*Bob Dixon, W8ERD, Delaware, Ohio*

TOWARD A MORE INCLUSIVE AMATEUR RADIO

♦ I would like to answer Wayne Hoffman's, W6WLR, response to KF6EOJ's original comments ("Amateur Radio is Not a Personal Radio Service," January 2001 "Correspondence"). I fly model aircraft and some of my friends were getting ham licenses so that they could use the 6-meter band for radio control. I didn't know anything about Amateur Radio, but thought it would be a good idea to get a license also. Some of my friends don't own a transceiver and have never operated a radio other than to fly models. I, on the other hand, have gotten into Amateur Radio to the detriment of my model flying. I have become the Assistant District Emergency Coordinator for the Northern District of San Diego County. I have worked parades, street fairs, ARES hospital drills, cross country races and many other events.

My first impression of ham radio was very much like the hiker who thought that it would be good to have a ham radio to use in an emergency. I *did* think that Amateur Radio was a personal radio service. During my license studies I discovered the deeper aspects of the hobby.

As I see it, Amateur Radio is an exclusive club fostered by the FCC and their licensing procedures. Why are we plagued with this superior-than-thou mentality? Isn't there room for anyone who passes the requirements to be called an Amateur Radio operator with access to all the privileges granted by the FCC? Rather than exclude new participants, why don't we welcome everyone who would like to experience the joy of being a ham?

If we need strength in numbers, then my friends flying models can be counted. Remember that all this started with my wanting to fly model airplanes, have an emergency radio, talk to my friends—you fill in the blank.

I'm working on my General and don't look forward to the code, but then maybe I will find that, like Amateur Radio, it too has something to offer. The license is not so much a permission to operate, but more an opportunity to learn.—*Norm Swanson, KF6GOF, San Diego, California*

THE MORSE QUESTION

♦ David Sumner's editorial "The Morse Question" in the January 2001 *QST* was quite fair and balanced—significantly more so than some that I've read in *QST* in the past. Could it be that the advent of the 21st century has shaken a few of the HQ cobwebs?

I would never suggest that there's anything wrong with Morse. It has great virtues and I can see it finding application in the amateur community for decades to come. It should never be banned, as some other services have done.

But…

That same issue of *QST* contained no less than three articles extolling the virtues of various low power, narrow-band digital modes such as PSK31. Low power? Narrow band? Those are some of the good things about Morse, too.

Thus, my question: I'd love to be able to use these modes. Would someone please explain to me how knowing—or not knowing—Morse has anything to do with using and enjoying *other* (read: computer based) digital modes? Your answer is not allowed to use words like "tradition," "history" and "quality operators." I reject the argument that because you had to suffer learning this mode, I must suffer as

well—even if I never intend to use it. Morse should be just another mode, whose use is optional at the personal level.

Yes, I know about the international treaty requirements. I see light on the horizon there. If and when the Morse requirement is dropped from such treaties, I would encourage all involved in the US to recognize that we are indeed in the digital age and that favoring one digital mode in some special way is no longer valid. Want to make the written tests more technical? Why not? This is supposed to be a technical hobby, and there's always the entry level license for those less technically inclined.—*David H. Hamley, K3PRR, Belle Vernon, Pennsylvania*

FULL REPLACEMENT VALUE

♦ I was typing on my keyboard when, suddenly, *boom!* One minute I was a ham with Internet capability, transceivers on several bands, plenty of station accessories and more. The next minute everything was gone in puffs of smoke—including my computer, printer and satellite TV receiver. What happened? Was it the end of the world?

No, just an accident. The power company had pulled my antenna into high voltage lines and the massive surge of electricity had found a path to most of the electronics in my home. You'd think the power company would accept responsibility and quickly reimburse me for the damages. Well, it doesn't always pay to be an optimist.

I finally received payment after much paper chasing and faxing, but it was for the *depreciated* value of my equipment. To replace everything that was lost, I had to furnish a substantial sum from my own pocket. First one "shock," then another!

The moral of the story is simply this: Insure your gear and pay whatever extra premiums are necessary to obtain *full replacement coverage.*—*Don McNamara, KN4M, Hyden, Kentucky*

[*ARRL "All Risk" insurance does offer full replacement coverage. More information is available on the Web at* **www.arrl.org/FandES/field/regulations/insurance/equipment.html**—Ed]

ELIMINATE THE CODE REQUIREMENT

♦ The ARRL should support the elimination of the code requirement for Amateur Radio licensing. Don't get me wrong. I love CW and come by this love naturally. My father and all his brothers were commercial CW operators. I learned the code before I went to school more than 60 years ago using an "Oscillatone" practice set given to me by my uncle, the legendary Ted McElroy.

I am sure that Ted McElroy would be mystified by the current flap over CW. To him, telegraphy was a means not an end. It was a means to accurate, reliable, and (only then) fast communication. If he were alive today, he would be trying to figure out how to make money with digital communication.

CW will live on as an art to be mastered, as a wonderful, civil means of communication, as a way for the little guy to get out, and as a fascinating link to our past.—*Howard McElroy, W2WSL, Southampton, New York*

BORED NO LONGER

♦ Sure, I admit it. Amateur radio was getting, well, dull. I'd worked 200-plus countries. I was bored with cookie-cutter CW and SSB contacts. Deliberate interference with DX nets was discouraging and turning many into chaos nets. Heck, how many antennas could one build and really use? New issues of *QST* were being tossed in the recycle pile, unread.

Then the January 2001 issue arrived. The monthly toss failed to reach the pile and it fell open to the "2001 W1AW HF Digital Run" article. Interesting idea, I thought. Then I saw where to get the software on the Internet and before I knew it, I was receiving PSK31 transmissions and marveling at what was happening. I was tinkering and experimenting again and more excited about the hobby than at any time in recent years.

Time will tell how long PSK31 remains interesting. For now, though, look for me on PSK31!—*Sam Alcorn, KB3DFJ, Lewisburg, Pennsylvania*

WATCH THOSE E-MAIL LINKS

♦ I enjoyed Don's, WB8HQS, article "Does Your Club Need a Web Site?," in the January 2001 *QST*. It had excellent advice, which altogether too few site authors follow these days. Flashing animations and background audio tend to drive me away from a site.

There is one item I would be wary of, however: "Make extensive use of 'mail-to' links..." These do make it easy for visitors to contact club officers. Unfortunately, they also make it easy for spammers (junk e-mailers) to contact them.

Spammers use programs that scan the Web looking for e-mail addresses on pages. Each address they find is saved to a database, and eventually sold to other spammers. Post your club officers' e-mail addresses on a Web page, and they can count on receiving dozens of junk messages on a regular basis. Use mail-to links at your own risk.—*Doug Smith, W9WI, Pleasant View, Tennessee* QST

MIRAGE . . . 160 Watts on 2 Meters!

Turn your mobile, base or handheld into 160 Watt powerhouses and talk further, longer, clearer . . . All modes: FM, SSB, CW . . . Superb GaAsFET preamp . . . Overdrive, high SWR, Over-temperature protection . . . Remote controllable . . .

MIRAGE RUGGED!

B-5016-G
$299
Suggested Retail

The MIRAGE B-5016-G gives you 160 Watts of brute power for 50 Watts input on all modes -- FM, SSB, or CW!

Ideal for 20 to 60 Watt 2 Meter mobile or base. *Power Curve* chart shows typical output power.

Hear weak signals -- low noise GaAsFET preamp gives you excellent 0.6 dB noise figure. Select 15 or 20 dB gain.

B-5016-G has legendary ruggedness. *We know of one that has been in constant use since 1979!*

Heavy-duty heatsink spans entire length of cabinet -- prevents overheating. Power transistors protected by MIRAGE's *Therm-O-Guard*™.

Fully protected from high SWR and excessive input power. Has warning LED.

Has smooth adjustable Transmit/Receive switching with remote external keying.

Draws 17-22 Amps at 13.8 VDC. 12x3x5½ in.

RC-1B, $45. Remote Control. On/Off, preamp On/Off, selects SSB/FM. With 18 foot cable.

Power Curve -- typical B-5016-G output power

Watts Out	130	135	140	145	150	155	160	165
Watts In	20	25	30	35	40	45	50	55

More 160 Watt, 2 Meter Amplifiers . . .

B-2516-G, $299. For 10 to 35 Watt mobile or base stations. 160 Watts out for 25 Watts in.

B-1016-G, $379. MIRAGE's most popular *dual purpose* HT or mobile/base amplifier. 160 Watts out for 10 Watts in. For 0.2-15 Watt transceivers.

B-1016-G Great for ICOM IC-706!

B-215-G, $379. MIRAGE's most popular *handheld* amp. 150 Watts out with 2 watts in; 160 watts out with 3½ Watts in. For 0.25 to 5 Watt handhelds radios.

100 Watts for 2 Meter HTs

B-310-G
$199
Suggested Retail
MIRAGE RUGGED!

Power Curve -- typical B-310-G output power

Watts Out	25	50	75	95	100	100	100	100
Watts In	¼	½	1	2	4	6	7	8

- *100 Watts out with all handhelds up to 8 Watts*
- *All modes: FM, SSB, CW*
- *Great for ICOM IC-706*
- *15 dB low noise GaAsFET preamp*
- *Reverse polarity protection*
- *SWR Protection*
- *FREE mobile bracket*
- *Auto T/R Switch*
- *FREE handheld BNC to B-310-G patch cable*
- *Ultra-compact 4³/₄x1³/₄x7³/₄ inches, 2½ pounds*
- *One year MIRAGE warranty*

***Boost** your 2 Meter handheld to 100 Watts!* Ultra-compact all mode B-310-G amp is perfect for all handhelds up to 8 Watts and multimode SSB/CW /FM 2 Meter rigs. *Great for ICOM IC-706!*

35 Watts for 2 Meter HTs

B-34-G
$89.95
Suggested Retail

Power Curve -- typical B-34-G output power

Watts Out	18	30	33	35	35	35	35+
Watts In	1	2	3	4	5	6	8

- *35 Watts Output on 2 Meters*
- *All modes: FM, SSB, CW*
- *18 dB GaAsFET preamp*
- *Reverse polarity protection*
- *Includes mobile bracket*
- *Auto RF sense T/R switch*
- *Custom heatsink, runs cool*
- *Works with handhelds up to 8 Watts*
- *One year MIRAGE warranty*

MIRAGE RUGGED!

35 Watts, FM only . . . $69.95

B-34, $69.95. 35 Watts out for 2 Watts in. Like B-34-G, FM only, less preamp, mobile bracket. 3⅛x1¾x4¼ inches.

MIRAGE Dual Band 144/440 MHz Amp

BD-35
$159.95
Suggested Retail

Power Curve -- typical BD-35 output power

Watts Out 2 Meters	30	40	45	45	45	45	45+
Watts Out 440 MHz	16	26	32	35	35	35	35+
Watts In	1	2	3	4	5	6	7

- *45 Watts on 2 Meters/35 Watts on 440 MHz*
- *Auto Band Selection*
- *Auto T/R Switch*
- *Full Duplex Operation*
- *5x1³/₄x5 inches*
- *FREE mobile bracket*
- *"On Air" LEDs*
- *Single Connector for dual band radios and antennas*
- *Reverse polarity protection*
- *Works with all FM handhelds to 7 Watts*
- *One year MIRAGE warranty*

Add this Mirage dual band amp and boost your handheld to a powerful mobile or base -- 45 Watts on 2 Meters or 35 Watts on 440 MHz! Mirage's exclusive *FullDuplexAmp*™ lets you talk on one band and listen on the other band at the same time -- just like a telephone conversation. *(Requires compatible HT).*

6 Meter Amplifier

FCC Type Accepted

The A-1015-G, $389, is the *world's most popular* all mode FM/SSB/CW 6 Meter amplifier. 150 Watts out for 10 in. For 1 to 15 Watt transceivers.

70 cm Amplifiers (420-450 MHz)

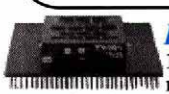
D-3010-N, $365 -- 100 W out/30 in. For 5 to 45 Watt *mobile/base*. **D-1010-N, $395**, 100 W out/10 in. *Dual purpose* -- for handhelds or mobile/base. **D-26-N, $269**, 60 W out/2 in, for *handhelds*.

Amateur TV Amps

Industry standard ATV amps -- **D-1010-ATVN, $414**, 82 Watts PEP out / 10 in.
D-100-ATVN, $414, 82 Watts PEP out/2 in. (without sync compression).

Remote Control Head for Amps

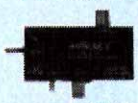
RC-1, $45, remote controls most MIRAGE amps. Check with Mirage for compatibility. Power On/Off, preamp On/Off, switch for SSB/FM. 18 foot cable (longer available). Tiny 1³/₄x3³/₄x2½ inches.



Repeater Amps

11 models -- continuous duty all mode FM/SSB/CW repeater amps for 6, 2, 1¼ Meters, 70 cm, 450 MHz, ATV.

Low noise GaAsFET preamps



KP-1

KP-2

High gain ultra low noise GaAsFET preamps for receiving weak signals. Selectable gain prevents receiver intermod. 15 to 22 dB gain. Less than 0.8 dB noise figure. Automatic RF switching up to 100 Watts.

Choose *In-Shack* model or *Mast Mount* (includes remote control) model to reduce loss. Rugged die-cast enclosure.

Frequency (MHz)	In Shack $139	Mast Mount $195
28-30	KP-1/10M	KP-2/10M
50-54	KP-1/6M	KP-2/6M
144-148	KP-1/2M	KP-2/2M
220-225	KP-1/220	KP-2/220
430-450	KP-1/440	KP-2/440

1¼ Meter Amps (223-225 MHz)

Choose from 10 models -- 20 to 220 Watts out for 2 to 50 Watts in, $129 to $655.

Commercial Amps ($199 to $395)

FCC Type Accepted

Commercial Amps for 150-174, 450-470 MHz and VHF marine bands, 70-130 Watts out.

Accurate SWR/Wattmeters

Read SWR directly and Forward/Reverse, Peak/Average power. Remote coupler. 1.8-30, 50-200, 420-450, 1260-1300 MHz band models.

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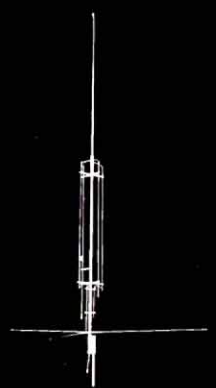
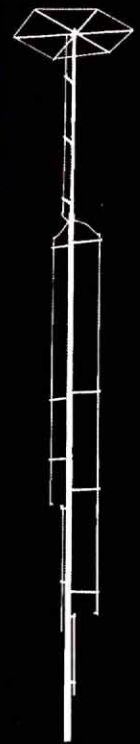
We at GAP realize there isn't a perfect antenna. No singular antenna will scream DX on 80 and be the best for local nets on 10. If anyone tells you there is, beware! The perfect antenna does not exist, but the right one for you may. If you want something to bust the pile on the low bands, then consider the Voyager. Just starting out in ham radio and need a great general coverage antenna, the Challenger is easy to assemble and for little effort will yield superior performance, especially on DX. Maybe you knowingly or unknowingly moved into one of those "restricted areas" where the Eagle's limited visibility, but unlimited ability is desired.



Eagle DX

Challenger DX



Voyager DX

This chart helps you select the right GAP antenna. When comparing GAPs, bandwidth is not a concern. With few exceptions, a GAP yields continuous coverage under 2:1 for the **ENTIRE BAND**.

All antennas utilize a GAP elevated asymmetric feed. A major benefit is the virtual elimination of the earth loss, so more RF radiates into the air instead of the ground. This feed is why a GAP requires **NO RADIALS**. Just as elevating a GAP offers no significant improvement to its performance, adding radials won't either, making set up a breeze.

A GAP antenna has no traps, coils or transformers. This is important. The greatest sources of failure in multiband antennas are these devices. Perhaps you heard someone discuss a trap that had melted, arced or became full of water. Improvements to these inherent problems are the focus of the antenna manufacturer, while the basic design of the antenna remains unchanged. **GAP improved the trap by eliminating it!** Removing these devices means they don't have to be tuned and, more importantly, won't be detuned by the first ice or rain. The absence of these devices improves antenna reliability, stability and increases bandwidth.

Another major advantage to a GAP antenna is its NO tune feature. Screws are simply inserted into predrilled holes with a supplied nutdriver.

The secret is out and people in the know say:

CQ–"The GAP consistently outperformed base-fed antennas...and was quieter."

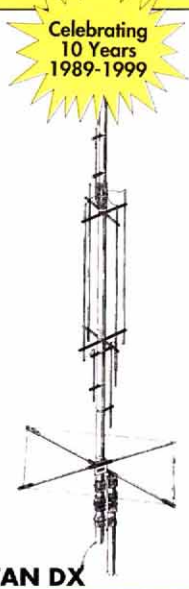
73–"This is a real DX antenna, much quieter than other verticals."

RF–"To say this antenna is effective would be a real understatement. Switching back and forth on 40m between another multiband HF vertical and the GAP, there was no comparison. Signals were always stronger on the GAP, sometimes by S units, not just DB's."

Worldradio – "These guys have solved the problem associated with verticals. That is, an awful lot of RF is wallowing around and dropping into the dirt instead of going outward bound. A half-wave vertical does need radials if it is end fed (at the bottom). But the same half-wave vertical does not (as much, hardly at all) if is fed in the center."

IEEE–"Near field and power density analyses show another advantage of this antenna (asymmetric vertical dipole): it decreases the power density close to the ground, and so avoids power dissipation in the soil below it. The input impedance is very stable and almost independent of ground conductivity. This antenna can operate with high radiation efficiency in the MF AM standard broadcast band, without the classical buried ground plane, so as to yield easier installation and maintenance."

Celebrating 10 Years 1989-1999



TITAN DX

This all purpose antenna is designed to operate 10m-80m, WARC bands included. It sits on a 1-1/4" pipe and can be mounted close to the ground or up on a roof. Its bandwidth and no tune feature make it an ideal antenna for the limited space environment as well as a terrific addition to the antenna farm.

MODEL	BANDS OF OPERATION											HT	WT	MOUNT	COUNTER-POISE	COST
	2m	6m	10m	12m	15m	17m	20m	30m	40m	80m	160m					
Challenger DX	■	■	■	■	■		■		■	■		31.5'	21 lbs	Drop In Ground Mount	3 Wires @ 25'	$299
Eagle DX			■	■	■	■	■		■			21.5'	19 lbs	1-1/4" pipe	80" Rigid	$309
Titan DX			■	■	■	■	■	■	■	■		25'	25 lbs	1-1/4" pipe	80" Rigid	$339
Voyager DX							■		■	■	■	45'	39 lbs	Hinged Base	3 Wires @ 57'	$429

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By Frank N. Musso, WA5QHV

Laser Generated Antennas

Tired of ungainly fixed-dimension antennas that require unsightly and expensive towers and support structures? With breakthrough LGA technology, your antenna automatically adjusts itself to match frequency and propagation requirements—and no tower is necessary!

Not since the invention of the transistor by Bell Laboratories more than 50 years ago has the electronics world been rocked by such a landmark invention. We stand on the threshold of a new millennium of computer-aided communication electronics with the recent development of Laser Generated Antenna (LGA) systems that offer the ability to transmit radio-frequency energy over laser beams that function as antennas. Yes—it's right from the pages of a Buck Rogers adventure!

Several months ago, while on a business trip to Sweden, I was able to visit Lars Bresden, an old university friend and owner of Teragram Labs. He was kind enough to give me the grand tour of his facilities. The research work there boggles the mind. What started out as basic research on cold fusion serendipitously blossomed into this new miracle technology. His company is now involved in qualitative research of the discovery.

Teragram Labs is pioneering antennas that operate via laser beams. The frequency range is virtually unlimited. Many frequencies and configurations are being tested, and the results are promising as well as astonishing. Although commercial production is still a long way from becoming reality, the technology and materials are available to accomplish what seems to be the impossible. Several prototypes are being earnestly evaluated. Radio amateurs will pioneer this new technology.

Again, the Black Box

The prototype of electronic wizardry that I was shown is about the size of a telephone book (see Figure 1). As far as I could tell, the box consists of two sections. The first, the heart of the system, uses a microprocessor to control all functions. A second chip is part of a redundancy circuit. The second section generates the laser element(s) through a series of fiber optics circuits, along with the use of micro-mirror relays (see Figure 2). Users do not observe the "skin effect" with an LGA (common with ordinary coax). The way the director and driven elements are generated is pure applied science fiction. I really don't understand all that I know about this.

When I asked about how the system worked, Lars just smiled. Without giving a hint about this new technology, he said that the LGA functioned as an automatic tuner, as well as an amplifier. As you dial in the desired frequency on your transceiver, the black box automatically generates a correctly sized antenna for that frequency, thereby providing an SWR of 1:1. You get a new element each time you change frequency.

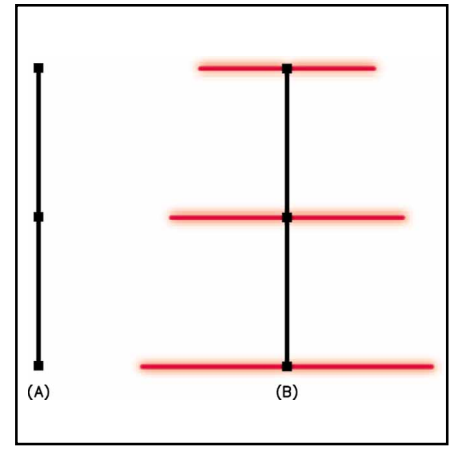
The laser element(s) are sent through special connectors (see Figure 3). Some fittings are articulated so they can be adjusted for just about any configuration (vertical, sloper, dipole, multielement beams, etc).

There is no discernable attenuation from nearby objects, and the elements can take the excitation power and increase it by a factor of 0.05. This is too good to be true. There are still some technical bugs

Figure 1—I surreptitiously grabbed this photo of the LGA prototype control box. Ugly construction at its finest.

Figure 2—A view of the LGA micro relay housing.

Figure 3—One of the more exotic components of the LGA: An antenna fitting designed to emit laser beams!



An artist's conception of the LGA in action. Before the lasers are activated, the only thing visible is the boom (A). When the beams fire, elements of pure photonic energy appear automatically (B).

that must be worked out. So far only QRP power has been used. Eye protection is paramount and all laser safety precautions are in effect.

Lars let me sit at the controls of a Kenwood TS-570 that was set up in the lab, and in just a few minutes, running only 10 W, I was able to work three stations on 20 meters. The most distant station was approximately 1200 miles away. The LGA nozzles were configured as a dipole only 25 feet high, just outside the lab window.

Although the grounding system is still a mystery, actual operation—transmitting and receiving—was indescribable.

Pandora's Box?

The possible uses of this new technology opens doors to applications that, until now, have been out of reach. Weather will never affect antenna systems ever again! Neighbors won't complain about unsightly yard structures. The people involved in stealth technology can combine this with spread spectrum techniques and really become invisible!

According to Teragram Labs, we should see the first LGA Amateur Radio systems reach the market by next April.

You can contact the author at 804 Guidroz St, Franklin, LA 70538-4609; **wa5qhv@arrl.net**. QST

NEW PRODUCTS

HEIL SOUND BRINGS BACK THE BM-10

◊ Heil Sound recently announced that they have resumed production of the BM-10 boom mike headsets.

The BM-10 was originally produced at the request of members of a 1985 DXpedition to Navassa. It was dropped from the Heil product line years ago. After numerous inquires from customers, however, the company decided to retool and re-release the model.

The lightweight headset features an adjustable headband with dual small-diameter foam ear pads. The microphone element housing is mounted on a metal "arm." The position of the microphone is adjusted via a pivot and slide system.

The BM-10 is available with three different microphone element types: Heil's popular HC-5—providing wide range frequency response for ragchewing; the HC-4—an element that accentuates the higher range of frequencies for DXing and contesting; and their new "articulate element"—specifically designed for use with ICOM transceivers.

The new headsets use Heil's AD-1 Boomset Adapter series for radio interfacing. These are sold separately. (The model that's designed for use with the ICOM radios does not require an adapter.)

For more information visit your favorite Amateur Radio products dealer or contact Heil Sound, 5800 N Illinois, Fairview Heights, IL 62208; tel 618-257-3000; fax 618-257-3001; **info@heilsound.com**; **www.heilsound.com/**.

REFLECTIVE CALL SIGN DECALS

◊ Reflectively Yours offers custom call sign decals made of 3M ScotchLITE reflective sheeting.

The material is the same as that used for the markings on ambulances, police and fire vehicles and adheres to almost any smooth, dry, clean surface. It is designed to produce maximum reflectance at distances greater than 3 feet, with increased distance resulting in a larger angle of view.

For additional information contact Reflectively Yours, 3 Ellen Lane, Glenville, NY 12302; tel 518-399-9339; **laus556@arrl.net**.

IMPROVED HEX-BEAM FROM TRAFFIE TECHNOLOGY

◊ Traffie Technology has recently incorporated several design changes into their line of compact HF multiband directional antennas. These are intended to increase the durability and raise the power handling capabilities.

Improvements include the use of UV resistant Phillystran line in the non-element spans, heavy duty machined ferrules in two-piece fiberglass arms, a redesigned center support with Teflon insulation at the feed point and an internal wiring harness.

All Hex-Beam arrays come factory-tuned and partially assembled, speeding the installation process. Three model lines are available: the HX, the HXL (HX "light") and the HEX-PAC.

The HX and HXL model series include monoband versions for 6 through 40 meters and feature several multiband arrays.

The HEX-PAC line is designed for portable operation and will break down to fit into a 43 × 6-inch tote bag for easy transport.

Traffie's top-of-the-line HX-5B is a multiband antenna primarily for fixed station applications. It covers 20, 17, 15, 12 and 10 meters, has a 9 1/2-foot turning radius, and weighs just 20 lbs. The RF power rating is 1500 W. The current price is $749 plus shipping and handling.

Traffie now also offers the HDX-30, a support mast for use with the HX-5B. The 18-lb telescoping aluminum mast extends to 30 feet. The sections lock together, allowing antenna rotation by hand or with a ground-mounted rotator system. The HDX-30 is priced at $329 plus shipping and handling. (It can be shipped by UPS.)

For further information on the complete range of Hex-Beam products, contact Traffie Technology, 421 Jones Rd, Ashby, MA 01431; tel 888-599-2326; tel/fax 978-386-7900; **www.hexbeam.com**.

Next New Products QST

By Al Williams, WD5GNR

Bridge the Digital Divide—*Basically*

If you think working with microprocessor-based circuits is frustrating and complicated, you haven't been introduced to the Basic Stamp—a powerful, yet friendly, digital building block that puts scores of smart circuits at your fingertips. Here's how to get started.

Hams often speak in strange lingo. As a ham you should be able to easily decipher the following:

TU OM ES GL 73 DE WD5GNR.

But what about the next group?

```
BSF PORTA,3
MOVF SBYTE,W
ADDWF PCL,F
```

Unless you know about PIC microprocessors, those three lines probably seem like gibberish. Because an increasing number of ham radio projects depend on microprocessors, don't be surprised if you can decipher this new "code" sometime in the not-too-distant future.

Microprocessors (or microcontrollers) offer unparalleled flexibility and can replace dozens or even hundreds of other components in modern radio systems. Microprocessors no longer require expensive, special-purpose programming hardware, so more designers are using them instead of ordinary logic ICs.

Most microcontrollers have limited memory capacities, however, so designers often use assembly language—like the snippet above—to control the microprocessor and conserve precious memory space. Although that approach leads to efficient programs, many people find assembly language difficult to learn and tricky to work with—especially the bare-bones assembly languages that usually accompany microcontrollers.

If you want to design and build modern projects, you may not have to learn assembly language. The fastest possible route from idea to finished product is via a line of small controllers that use a simple-to-learn *Basic*-like language called *PBasic*. Although *PBasic* is easy to learn and use, it has powerful commands tailored to the types of tasks hams and computer experimenters want microcontrollers to perform. On top of that, these microcontrollers—called Basic Stamps—require practically no external components.

The Hardware

There are several types of Basic Stamp processors, all made by Parallax.[1] More expensive Stamps have more memory and are faster than the less expensive chips. The two most common Stamps are the BS1 and the BS2. The BS1 has eight I/O pins and stores 256 bytes of instructions. Although 256 bytes of program storage (and 14 bytes for variables) sounds like a miniscule amount in these days of megabytes and gigabytes, for a small controller, it's often more than you'll need. The BS2 has 16 I/O pins and also stores 2048 bytes of instructions (along with 32 bytes of data).

You can buy the BS1 on a small PC board or as a 14-pin SIP. The BS2 looks like a standard 24-pin IC, but it's really a tiny PC board with IC pins. In addition to the BS2, you can also get the BS2SX, BS2E or BS2P which have more memory and features but are more expensive. These processors are also faster than the BS2, but consumes more power. For most projects, the BS2 is a good trade-off between cost, speed and power. In this article I'll focus on the BS2 exclusively. If you learn to use it, you'll have no problems with the other chips.

One of the best features of the Basic Stamp is how easy it is to connect the hardware. The BS2 has its own regulator and clock circuits. You can simply connect a 9-V battery (the voltage can range from 6 to 15 V) and the Basic Stamp is ready to go. It's that simple. Of course, you also need to connect whatever circuitry you want to monitor or control, but the microprocessor itself merely needs a power supply. If your project already has a dc supply, you can probably use that instead.

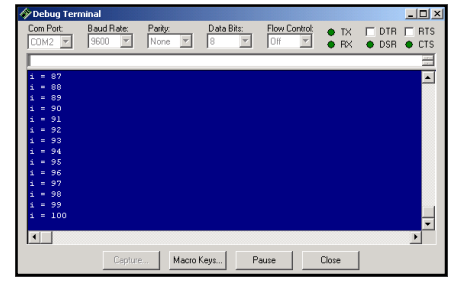


Figure 1— One handy use for the Stamp's built-in port is to print informational messages for debugging purposes right back to the Stamp program. You can do this with the *DEBUG* statement, as shown here.

The BS2 is quite different from traditional microprocessors that need regulated power supplies (perhaps even multi-voltage supplies) and external clock circuits.

Programming

The Stamp, super chip that it is, won't do a thing without programming. The BS2 connects to a PC using the PC's serial port, but because the BS2 doesn't have a standard RS-232 port, you may need to devise a way to connect a serial cable to your project. Typical BS2

[1]Notes appear on page 34.

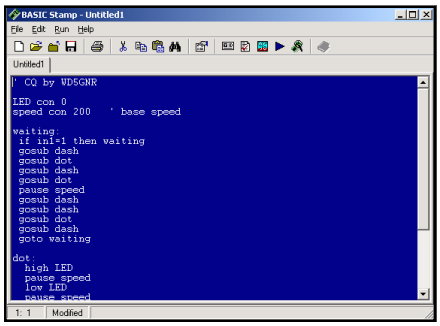


Figure 2—Using *Parallax* software to create a program to call CQ. The complete program listing is shown elsewhere in this article.

projects have RS-232 ports anyway, so that's not always a problem. The port requires only four pins, so if you only need to program the device you can put a simple four-pin connector on the board and wire a custom cable.

You can also buy a carrier board from the manufacturer. This is simply a PC board with some uncommitted holes and a serial port connector. If you want to work on a solderless breadboard (highly recommended for getting started) you can create a custom cable, use a prototyping adapter,[2] or buy the Stamp in a special form that can plug into a breadboard.[3]

In addition to the cable you'll need special software, which you can freely download from the Internet. You can also get the entire manual for the chip at the same Web site in Adobe PDF format at no charge.[4]

The programming software is shown in Figure 2. You simply enter your program and press Control+R (or the Run|Run menu) to download the program and execute it. Once you program the Stamp, it will remain programmed indefinitely—even if the power cycles. The PC connection is only required to program the chip.

The Stamp editor works like most *Windows*-based editors. If you create a new file, however, it appears as a tab near the top of the editor. This allows you to switch between multiple files even though only one can reside in the Stamp at one time. (To begin with, work with one file at a time.)

Your First Program

Once you have a programming cable and a 9-V battery (or other suitable power supply), you're almost ready to go. The only remaining task is to connect an external device to measure or control. Figure 3 shows a simple test circuit that consists of an LED and a switch. The pull-up resistor (R2) makes sure that P1 is high unless you press the switch (S1). The Stamp can read the state of P1 and

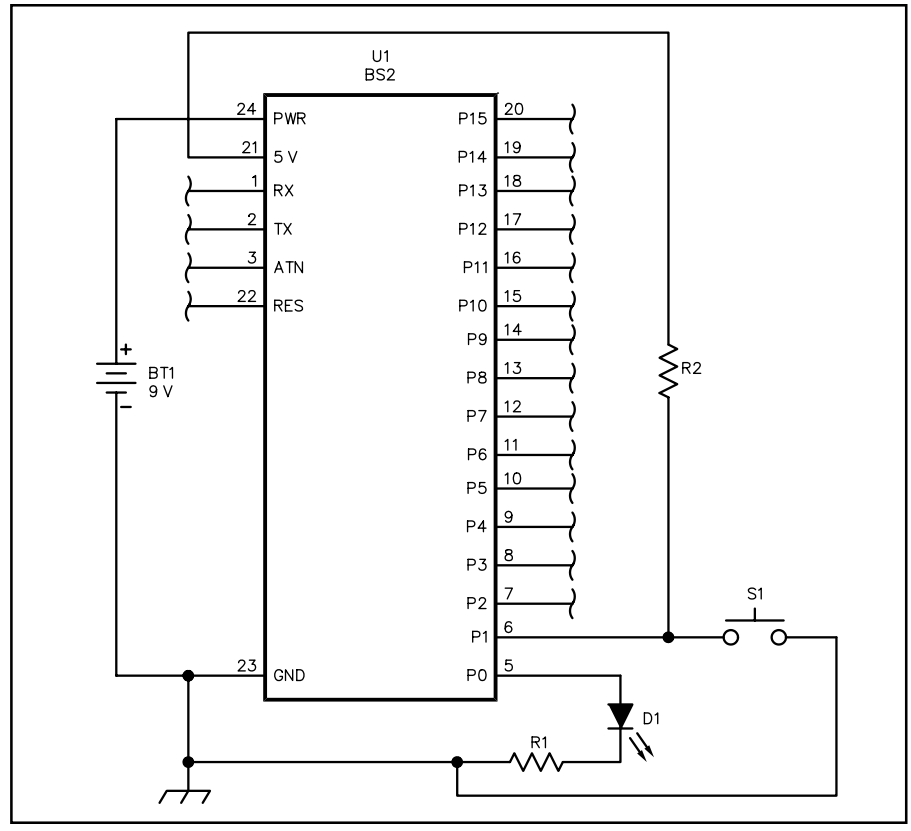


Figure 3—You can use this simple circuit to start experimenting with the Stamp.
B1—9-V battery
U1—BS2-IC (Basic Stamp)
D1—Red LED
R1—470 Ω, ¼-W resistor
R2—10 kΩ, ¼-W resistor
S1—SPST pushbutton switch

change the state of P0 to turn the LED on or off.

Each of the 16 I/O pins on the Stamp can be used as an input or an output. By default, the pins start as inputs, but you can change them to outputs at any time. You can even have pins that are sometimes inputs, sometimes outputs, depending on your program.

One potentially confusing Stamp convention is that the I/O pin numbers don't correspond to the IC pin numbers. For example, P0, the first I/O pin, is actually IC pin 5; P1 is pin 6, etc. It's easy to get confused.

Here's a simple BS2 program that will blink the LED connected to P0:

```
again:
  toggle 0
  goto again
```

If you've ever written a *Basic* program you can probably figure this out. Consider the program line by line:

again: This is a label. You can use almost any word you like, but it must begin with a letter and can't contain spaces. The label ends with a colon. Think of a label as a bookmark that holds a place in your program. Later, you can return to the bookmark to start the program at the labeled step.

toggle 0 This command forces pin 0 to be an output. If the output is a logical 0 (the default), the command toggles it to a logical 1 (about 5 V). If the output is already a logical 1, the command toggles it to a logical 0.

goto again This command simply executes the program back at the **again:** label.

This simple program makes the LED blink so fast that it looks like it's on all the time (unless you watch the output pin with an oscilloscope). Let's slow things down with the pause command:

```
again:
  toggle 0
  pause 500
  goto again
```

The pause command makes the program stop for the specified number of milliseconds. With a value of 500, the program will blink the LED at about 1 Hz (a half-second on and a half-second off).

The toggle command is a good example of the special commands that the Stamp uses to control external devices. You can find a complete list of Stamp commands in Table 1. Simple *Basic* constructs such as **for** and **if** are present, along with a host of I/O-related

Table 1
Basic Stamp II Commands

Command	*Description*	*Notes*
Branch	Jump to a label based on an index	
Button	Monitors a button	Provides debounce and auto repeat functions
Count	Counts pulses	
Data	Stores data in EEPROM	Stores at compile time
Debug	Write to the debug terminal	Usually uses your PC
Dtmfout	Generate DTMF tones	
End	Halt program execution	
For/Next	Basic-language loop	
Freqout	Generate one or two tones	
Gosub/Return	Subroutine call	
Goto	Unconditional jump	
High	Sets I/O pin to logic 1	Implies output
If/Then	Basic-language control flow	Conditional goto only
Input	Changes I/O pin to input	
Lookdown	Searches a table for a match	
Lookup	Finds an entry in a table	
Low	Sets I/O pin to logic 0	Implies output
Nap	Pause in low power mode	
Output	Changes I/O pin to output	
Pause	Pause program execution	1 mS resolution
Pulsin	Measures a pulse	2 µS resolution
Pulsout	Generates a pulse	2 µS resolution
Pwm	Pulse width modulation	Use to control motor speeds or generate analog voltages
Random	Generate a random number	
Rctime	Measures RC network charge	Use to read a potentiometer or any resistive or capacitive sensor
Read	Reads data from EEPROM	
Reverse	Changes I/O pin to opposite state	
Serin	Read RS-232 data	243 baud to 50 K baud
Serout	Send RS-232 data	243 baud to 50 K baud
Shiftin	Synchronous serial input	Use with SPI EEPROMs, A/Ds, etc
Shiftout	Synchronous serial output	Use with SPI EEPROMs, A/Ds, etc
Sleep	Pause in low power mode	
Toggle	Reverses logic level of I/O pin	Implies output
Write	Writes data to EEPROM	Stores at run time
Xout	Generates X-10 commands	Requires external hardware

commands such as **pwm**, **freqout**, **pulsin** and so forth.

Commands such as **toggle** require a pin number. You can also access pins as variables. For example, to read the switch as a binary digit, you can refer to **in1**. You can also directly set the LED's state using **out0**. Here's a simple program that turns on the blinking LED when you push the button:

```
waitbtn:
  if in1=1 then waitbtn
again:
  toggle 0
  pause 500
  goto again
```

Notice that the **if** statement can only jump to a label (such as waitbtn). You can't use the **goto** keyword, and you can't execute any statements. You can only jump to a label.

Of course, there is more than one way to accomplish any programming task. Here's another way to blink the LED:

```
again:
  high 0
  pause 500
  low 0
  pause 500
  goto again
```

Here, the **high** and **low** commands set the exact state of the output pin instead of switching it to the opposite state.

Subroutines are fundamental to re-using *Basic* code, and the Stamp supports the **gosub** command as any *Basic* should. A **gosub** command transfers control to a label much like a **goto**. Unlike a **goto**, however, a return statement will go back to the line following the **gosub**. For example:

```
again:
  gosub blink
  goto again
blink:
  toggle 0
  pause 500
  return
```

Not only is this easier to read, but it also saves space when you need to blink the LED from more than one place in your program. Even with this simple slate of commands, you can write some ham radio software right away. Listing 1 shows a very simple program that blinks CQ on the LED after you press the button. This isn't the most efficient way to write the program, but it works.

Notice that the program in Listing 1 uses several statements (near the top) that

Listing 1. Sending CQ

```
' CQ by WD5GNR

LED con 0
speed con 200   ' base speed

waiting:
 wait for switch
  if in1=1 then waiting
  gosub dash
  gosub dot
  gosub dash
  gosub dot
  pause speed
  gosub dash
  gosub dash
  gosub dot
  gosub dash
  goto waiting

dot:
  high LED
  pause speed
  low LED
  pause speed
  return

dash:
  high LED
  pause speed*3
  low LED
  pause speed
  return
```

use the **con** keyword. This defines a constant. By using a constant in the **pause** statements, you can change the Morse code speed by changing one number. Without the constant you'd have to change every pause statement separately. Lines that start with an apostrophe are comments and don't affect the execution of the program.

One of the strengths of the Stamp is that many of its PBasic commands replace dozens —or even hundreds— of lines of assembly language.

Learning More

There is a wealth of information on the Web about the Basic Stamp. The Parallax Web site is a good place to start. You might also enjoy my Basic Stamp FAQ.[5] If you like to read paper instead of computer screens, you'll enjoy my Basic Stamp book.[6]

With the Basic Stamp you can build computer controls into your ham radio projects with very little investment. Yes, the Stamp is more expensive than a barebones microprocessor, but the price is more reasonable after you deduct the cost of the extra components, the development tools, the complexity and the time spent writing and debugging assembly language.

One of the strengths of the Stamp is that many of its *PBasic* commands replace dozens—or even hundreds—of lines of assembly language. That means you can write programs in minutes that would take hours or days using traditional methods. A great example of this is the Stamp's **DTMFOUT** command. You can use this to easily generate TouchTones on any output pin. You can connect a piezo speaker (or filter the output and feed it to a transmitter). Suppose you have such a speaker connected to pin 0 of the Stamp. Here's the entire program required to dial a telephone number:

```
DTMFOUT 0,[1,8,0,0,5,5,5,1,2,1,2]
```

That's it! How do you trigger it? Simply turn the Stamp on. Push a button to make the Stamp dial and hold it down until it's done. If you really wanted to wait for a button (and leave the Stamp on all the time), you could change the program a little:

```
top:
' switch 0 when on
  if in1=1 then top
  dtmfout 0,[1,8,0,0,5,5,5,1,2,1,2]
done:
  if in1=0 then done
' wait for button up
  goto top
```

Generating TouchTones in software usually requires sophisticated wave synthesis techniques to generate the two simultaneous sine waves. But when using *PBasic*, you don't care. You simply use the **DTMFOUT** command and the Stamp does the rest!

Other sophisticated commands can handle serial I/O, pulse-width modulation, resistance or capacitance measurements and pulse counting. Of course, the Stamp also handles sophisticated integer math, something that's usually troublesome with ordinary microcontrollers.

Variables

If you're going to use math, you'll probably want to use variables. The Stamp provides several registers (working memory areas for data) that you can address by name. It's usually better, however, to ask the Stamp to assign registers to variables that have meaningful names. For example:

```
adin      var     byte
counter   var     word
```

This defines two variables. One is a byte (eight bits) and the other is a word (16 bits). The byte's name is **adin** and the word is named **counter**. Variables can also be of type **bit** (a single bit) or **nib** (four bits). The *PBasic* program automatically assigns registers to these variables (until you run out of registers and get an error).

You can also use the same syntax to provide an alias for another variable. This is useful if you want to reuse a single register in two non-conflicting places. For example:

```
tmpvar    var     adin
' can't use tmpvar and adin together
```

You can also give names to constants. For example:

```
pi100     con     314
limit     con     100
```

Math

The Stamp can do full-featured, 16-bit integer math. That includes multiplication and division, which are usually unpleasant to do on a microcontroller. What Stamps can't do is handle floating-point numbers. Therefore, 10/3 (10 divided by 3) results in an answer of 3, which can cause problems.

Another subtle point is that the Stamp evaluates math expressions from left to right, which is not how you normally work an equation. For example, consider this statement:

```
X=3+5*2
```

In high school math you learned that the correct answer is 13 (you do the multiplication before the addition). The Stamp, however, goes strictly left to right, so it computes the answer as 16 (addition first). Luckily, *PBasic* (for the Stamp II) supports parenthesis, so you could write:

```
X=3+(5*2)
```

This will produce the answer you expect without having to rearrange the equation.

There are several tricks to eliminating floating-point math. Sometimes you simply need to rearrange your equation. Suppose you read a value from an analog-to-digital converter (ADC). The byte is in a variable (**adin**). In addition, you have a constant defining the reference voltage input to the ADC (nominally 5 V). Because the ADC returns a number between 0 and 255 (a span of 256), each count is equivalent to about 19.5 mV (5/256) if the reference voltage is 5 V. Consider this code:

```
adin      var     byte
value     var     word
ref       con     5
value = ref/256*adin
```

This won't work because ref/256 is 0, so **value** will always be 0. You must rewrite the equation so the multiplication occurs first:

```
value = adin*ref/256
```

Even then, **adin** must rise above 52 before **value** can reach 1, which wastes a lot of resolution. What if you measured decivolts instead of volts (that is, use 0.1 V units)? Now, the reference value is 50 (5 V is 50 decivolts). So now, **value** will change for every five or six increases in **adin**.

You can't carry this reasoning too far, though. Suppose you decide to go to one more decimal point (centivolts, or 0.01 V increments). Of course, the ADC can produce only about half of that resolution. For the sake of argument, however, don't worry about that yet.

Expressing the reference value in centivolts results in a **ref** constant of 500. The problem is, when you multiply **adin** by ref, the maximum result is 255*500 or 127500. The largest 16-bit number is 65535. The Stamp will quietly overflow and produce an incorrect result.

Serial Capabilities

The Stamp has a special built-in half-duplex serial port (this is the port you use to program it). Your program can also use this serial port, or you can use any pin as a TTL-level serial input or output. One handy use for the built-in port is to print informational messages for debugging purposes right back to the Stamp program. You can do this with the **DEBUG** statement. For example:

```
i var word
for i = 1 to 100
debug ?i
next
```

This produces the output in Figure 1. For more general-purpose serial communications you can use the **Serin** and **Serout** commands. You can specify any of the 16 general-purpose I/O pins (0-15) or you can use the special pin number 16 to specify the built-in port. You can also control the baud rate and certain other parameters.

Because of the Stamp's robust inputs, you can actually connect a serial output through a 22-kΩ series resistor directly to an I/O pin. This works even though the pin may have to absorb ±12 V (just don't forget the resistor or you may damage the Stamp). You can usually drive an RS-232 receiver directly from a Stamp pin, although using 0 and 5 V for RS-232 signaling isn't standard.

Of course, you can also use an RS-232 driver (like the Maxim MAX232 chip[7]) to generate (and accept) true RS-232 signaling levels. The Stamp can support either mode of operation. The built-in port contains a level converter that "steals" –12 V from the transmitter (which limits it to half-duplex operation). You can find more details in the Stamp manuals.

Don't forget that the Stamp does one thing at a time. Therefore, if you're waiting for serial data, you can't do anything else until the data arrives, or your timeout expires. Similarly, if data arrives while you're not listening, it's simply lost. That means accommodating serial data requires careful planning and some form of handshaking (which the Stamp supports).

Pulse-Width Modulation

Another intriguing Stamp capability is pulse-width modulation. The **PWM** command allows you to generate a pulse stream with a specific duty cycle. For example, if you set the **PWM** command to 128, the output pulses will be high as much as they are low (50% duty cycle). Changing the value to 64 will make the output low more often than high (25% duty cycle).

You can use this pulse stream to control the brightness of an LED (or lamp) or even the speed of a motor. Although the Stamp has enough muscle to drive an LED, you'll need some extra circuitry to drive a motor. One of the most useful things you can do with pulse-width modulation is to use a simple RC network to integrate the pulses into a voltage. This allows you to create an analog voltage on an output pin with very little external circuitry. The voltage across an external capacitor will be proportional to the PWM duty cycle. So, if the duty cycle is 128, the voltage will be about 2.5 V.

The only problem with the Stamp's PWM system is that the Stamp does not multitask. Therefore, when you use PWM to charge a capacitor to a certain voltage, you have to eventually stop and do something else. The Stamp automatically switches the I/O pin to an input state, which has a high resistance. Unfortunately, the rest of your circuit may present enough of a load to rapidly discharge the capacitor.

This isn't always a problem. For example, suppose you create a capacitance meter (see below). You decide to make the output a voltage you can read with your digital voltmeter. Your meter's input resistance is probably 10 mΩ or more, so as long as you make the Stamp execute the **PWM** command regularly (maybe once a second or so), you won't see any significant error in the output.

On the other hand, suppose the voltage is driving a light bulb, which will quickly discharge the capacitor. In this case it's best to buffer the **PWM** output with an op amp.

Resistance and Capacitance

My high school math teacher always said, "You have to use what you know to discover what you don't." Computers aren't good at measuring analog quantities such as resistance and capacitance. On the other hand, they are *very* good at measuring time. You can use the Stamp to measure the time it takes for an RC network to charge or discharge, and that time relates to the value of a resistor and a capacitor in the network.

If you use a fixed capacitor you can measure the resistance (perhaps a potentiometer or a thermistor). If you provide a fixed resistor, the time will be proportional to a changing capacitance. The command that measures time is **Rctime**. You can charge or discharge the network (using the **High** or **Low** commands) and invoke **Rctime** to determine how long it takes the capacitor's voltage to reach the opposite state.

Pulse Measurements

The Stamp can also measure pulses using **Pulsin**, which returns the width of a positive- or negative-going pulse. You can also count the number of pulses over a given period using the **Count** command. These commands are excellent for measuring relatively low frequencies.

If you want to generate pulses you can use the **Pulsout** command. Don't forget, however, while you're measuring or generating pulses, nothing else is happening. So you can't constantly monitor pulses—you'll eventually have to stop to do additional processing.

Brave New World

What will you do with a Basic Stamp? Here are some ham radio ideas:

- A remote control for an RS-232 transceiver (use **Rctime** to read potentiometers and **Pulsin** to monitor an optical encoder).
- A simplex repeater (use a digital speech recorder).
- A control system for an auto-tuner.
- A smart rotator controller.

Basic Stamps aren't useful in every application. But for the many tasks they will handle, you can't find anything easier to program. The expense of the chip is minor compared to the expense of buying special hardware and software to program other microcontrollers—not to mention the expense of hours of frustrating programming in assembly language!

There's plenty more to learn about Basic Stamps, but luckily, there are plenty of online resources and books to help.[8] There is also an active e-mail reflector that supports the Stamp.[9] Be sure to check out my Basic Stamp FAQ[10] and my book on the Stamp,[11] which has many projects and some tips on how to move from the Stamp to the PIC, a more traditional microcontroller.

If you've been putting off learning about microcontrollers, the Stamp is the perfect way to get your feet wet. Just be warned: Once you've done one project, you'll think of at least a hundred you'll never have time to start!

Notes:

[1]Parallax Inc, 599 Menlo Dr, Suite 100, Rocklin, CA 95765; **www.parallaxinc.com**.

[2]See **www.al-williams.com/awce/asp2.htm** for more about the solderless breadboard adapters.

[3]The OEM Stamp can plug into a breadboard. See **www.parallaxinc.com/html_files/products/oem_stamp_brief.asp**.

[4]**www.parallaxinc.com/html_files/downloads/download.htm** has the software and documentation. You can also download free course material from **www.stampsinclass.com**. Although the course material is meant for classroom use, you can easily use them for self-study.

[5]The Basic Stamp FAQ is at **www.al-williams.com/wd5gnr/stampfaq.htm**.

[6]*Microcontroller Projects with Basic Stamps*, published by CMP Books, is available from the ARRL.

[7] Maxim's Web site is **www.maxim-ic.com**.

[8] See footnote 4.

[9] Log into **groups.yahoo.com** and sign up for the basicstamps group.

[10] See footnote 5.

[11] See footnote 6.

You can contact the author at 310 Ivy Glen, League City, TX 77573; **alw@al-williams.com**.

By Bob Reif, W1XP, Ralph Swick, KD1SM, and Stan Pozerski, KD1LE

The NVARC FoxFinder

Fox hunting is fun! This FoxFinder is a modern way to locate hidden two-meter transmitters. It's a project you can easily build yourself.

If you're active on 2 meters, you've certainly heard about "fox" (hidden transmitter) hunts. You may have even participated in them. Have you read Pete (N9SFX) Ostapchuk's article describing the fun you can have chasing foxes?[1] If so, you know something about the thrill experienced when you find that elusive fox, be it a person sitting in seclusion with an H-T, or a miniature automated fox disguised as a part of the natural landscape. Even if you don't dream of someday becoming an international athlete and representing your country in the Amateur Radio direction-finding competitions,[2] you can still combine an enjoyment of the outdoors with the thrill of a little friendly competition and the pleasure of exploring a nearby park or forest in search of a fox. The sport of fox hunting has practical spin-offs, too, as when you need to find a transmitter that's causing problems.

Anyone can find a hidden transmitter with an H-T and a portable Yagi and using body-fade techniques, but when you get close to the fox, simple equipment lets you down. H-Ts overload and body-fade techniques, even without an antenna on the H-T, can produce confusing results. In addition to receiver overload, signal reflections from buildings, trees and hills can lead you astray. Our Nashoba Valley Amateur Radio Club (NVARC) FoxFinder turns those last few hundred yards from a nightmare into a pleasure. If you're an active fox hunter, or are thinking about adding this skill to your list of accomplishments, you *need* the FoxFinder. It's a simple project, one you'll enjoy building!

Background

Several clubs in our central Massachusetts area regularly hide small, automated foxes. These foxes transmit a short message in voice or CW every three to five minutes. The transmitter our club uses is typically hidden in forests and conservation land, places in which you can be quite close to the fox and not see it. These are freestyle hunts—you can hunt alone or with a group. You also have the option to hunt whenever you want.

Over the years, many "sniffer" devices were designed to aid in locating hidden transmitters. We have used or observed many sniffers in action and found them lacking. Some designs have too many controls and require time-consuming adjustment during the hunt. Others have meters that are difficult to monitor as you stumble through the underbrush. Most designs lack the dynamic range to cover the last few hundred feet; others overload when close to a 5-W transmitter.

We were looking for a club project and fund-raiser. We wanted a small project that members could have fun assembling as a bag-of-parts kit. With these objectives in mind, we intensified our search for a suitable sniffer.

Designing a Sniffer

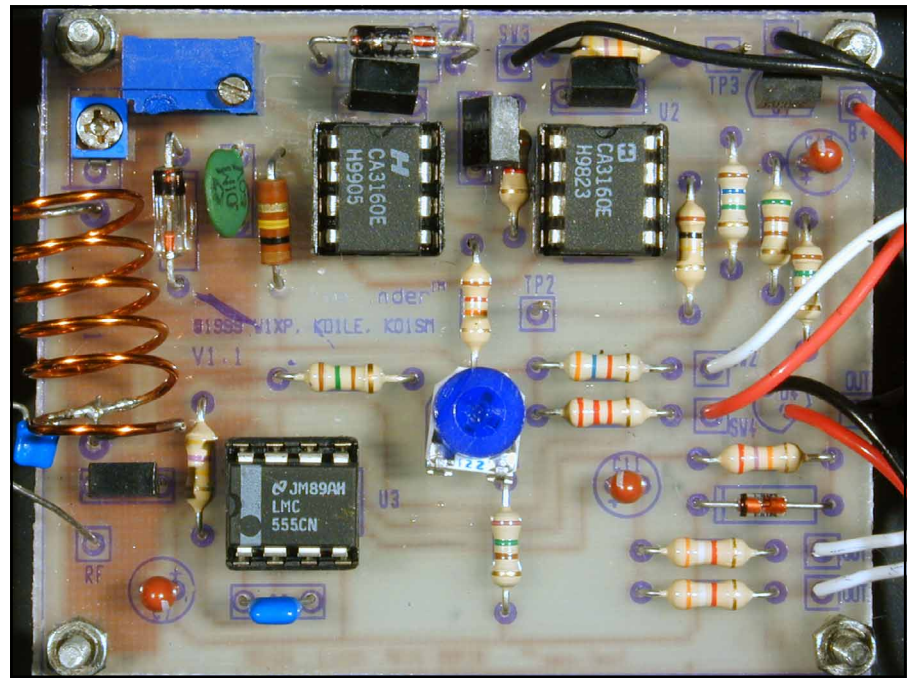
One Saturday afternoon after a morning's fox hunt, we were having lunch at a local fast-food emporium, lamenting for the umpteenth time that we'd once again spent a lot of time on the last few hundred feet of the hunt because we lacked a good sniffer. At that moment, we decided to either improve one of the existing sniffer designs or devise one of our own. On a napkin, we listed the requirements we considered necessary in a satisfactory sniffer.

It had to be shirt-pocket size; that was on everybody's list. After some discussion, we decided to use an audible tone instead of a meter or LEDs as the signal-strength indicator; we wanted our eyes free to watch for other things—such as tiny transmitters! Besides, a meter would add to the project cost and LED displays use precious power and are difficult to read in bright sunlight. We wanted a minimum of controls that might get bumped out of adjustment while running through the woods. We even rejected the idea of a volume control. We opted for headphones instead of a speaker, both for privacy when hunting in a group and for extending battery life. The sniffer's usable range was a very important issue for us; several existing designs were lacking here. We wanted a range of 1000 feet when using a hand-held 3- or 4-element Yagi and a 2-W fox. The sniffer also had

[1]Notes appear on page 39.

to work with the same antenna at a distance of a couple of feet from the fox—some of our transmitters are quite well disguised!

After evaluating several approaches, we found a suitable RF detector that looked like it would meet the range requirement. The most difficult part was developing an interface between the detector and the audio oscillator. After building a breadboard unit, some field testing and some changes, we had a design that excited us. We chose a case size and laid out a PC board. At this point, we made a decision that changed the nature of the project. We determined that the fox-hunting community might want more than a bag-of-parts kit, especially since some of our associates are not expert scratch builders. So, we wrote an assembly/instruction manual complete with an alignment, operation and troubleshooting sections. This task proved to be bigger than we had ever imagined! Next, we developed templates for the enclosure and included photos. Then, several kits were built by other hams who critiqued the kit and the instructions. That led to PC-board and instruction-manual changes and the final products.



A completed PC board ready for installation.

The Result

How well does the FoxFinder work? Well, using a 4-element portable Yagi, foxes with power levels of 300 mW to 2 W can be detected within 500 feet and frequently at greater distances, depending on terrain and vegetation. The 1000-foot goal is achieved in open areas. Typically, if you have a no-antenna signal on your sensitive 2-meter H-T, the FoxFinder can detect the signal with the Yagi. Once you can hear the signal with the FoxFinder, you can follow the signal in the direction of the highest-pitch tone. The typical fox transmission we use is 30 seconds or less, but by rotating a handheld 3- or 4-element Yagi, you can quickly determine in which direction to move. If you're jogging down a trail, you can even tell if you're closing on the fox by the pitch change of the audio tone. If the pitch is higher, you moved in the right direction; if it is lower, you are farther away.

The FoxFinder is simple to operate. Other than the **POWER** switch, there's just one control: a three-position **RANGE** switch that gives you an indication of how close you are to the fox. You start with the **RANGE** switch in the most-sensitive position. As the tone pitch you hear increases, you move the switch to the next less-sensitive position and proceed. In the least-sensitive position, you can use the FoxFinder and a 4-element Yagi to get within several feet of a 5-W transmitter without overloading the FoxFinder. With the FoxFinder, you can literally walk right up to a hidden transmitter!

Theory of Operation

Refer to Figure 1. There are three main sections in the FoxFinder, centered on three ICs: the detector (U1), the amplifier (U2) and the voltage-controlled oscillator (VCO), U3. The circuit around U1 consists of a wide-dynamic-range detector using two 1N34 germanium diodes and a tuned circuit. U1 provides the feedback gain that compensates for the usual nonlinear behavior of the diode detector.[3] The tuned circuit provides rejection of out-of-band signals and a voltage step up. U1's input threshold is offset above ground by about 0.5 V. (The exact value of the threshold voltage is adjusted by R9 during final alignment.) The same offset voltage is applied to the second stage, U2. This "floating ground" is used to set the minimum VCO voltage described later. R12 on the offset-trim terminal of the diode detector is set during alignment to compensate for U1's input-offset voltage. The first stage is then adjusted in such a way that it compensates for the offset of the second stage. The forward voltage drops of D2 and D3 are matched at low currents to provide improved temperature stability. The resulting diode detector operates with a wide range of signal inputs from a few millivolts to about 5 V to provide the desired range performance.

U2 is a switched-gain noninverting voltage amplifier. The three gain settings are selected by the **RANGE** switch. The voltage gain is about 23 in the **MAX** range position and just over one in the **MIN RANGE** position. This divides the FoxFinder's useful range into three overlapping segments. In the most sensitive position (**MAX**), the offset voltage is adjusted by R9 and the input offset is adjusted by R12, as stated earlier. When amplified by the high gain in the **MAX RANGE** position, this output is large enough to provide a voltage to the input of the audio-frequency VCO (U3) to produce a continuous low audio tone. Note that only the offset of the input above the threshold (a few millivolts), and not the full threshold offset, is amplified by the second-stage gain.

U3 is a CMOS timer IC. The VCO control voltage is the output of U2. This voltage charges C8 through R7 and R8 until a timing threshold voltage is reached. Then the timer changes state and discharges C8 through R8 until a lower timing threshold voltage is reached. At this point, the output switches again and the charging cycle starts over. The higher the control voltage, the more quickly the RC network charges and the higher the tone frequency.

To produce audio output, the VCO-input control voltage must be above the threshold of the 555 circuit. The input offset voltage of U1 and U2 achieve this voltage level without excessive gain or extremely large input signals. In the **MAX RANGE** position, the oscillator runs continuously, so that the smallest change in detected-signal level produces a pitch change, allowing detection of weak signals. The pulse output of U3 drives the headphones through C11 and current-lim-

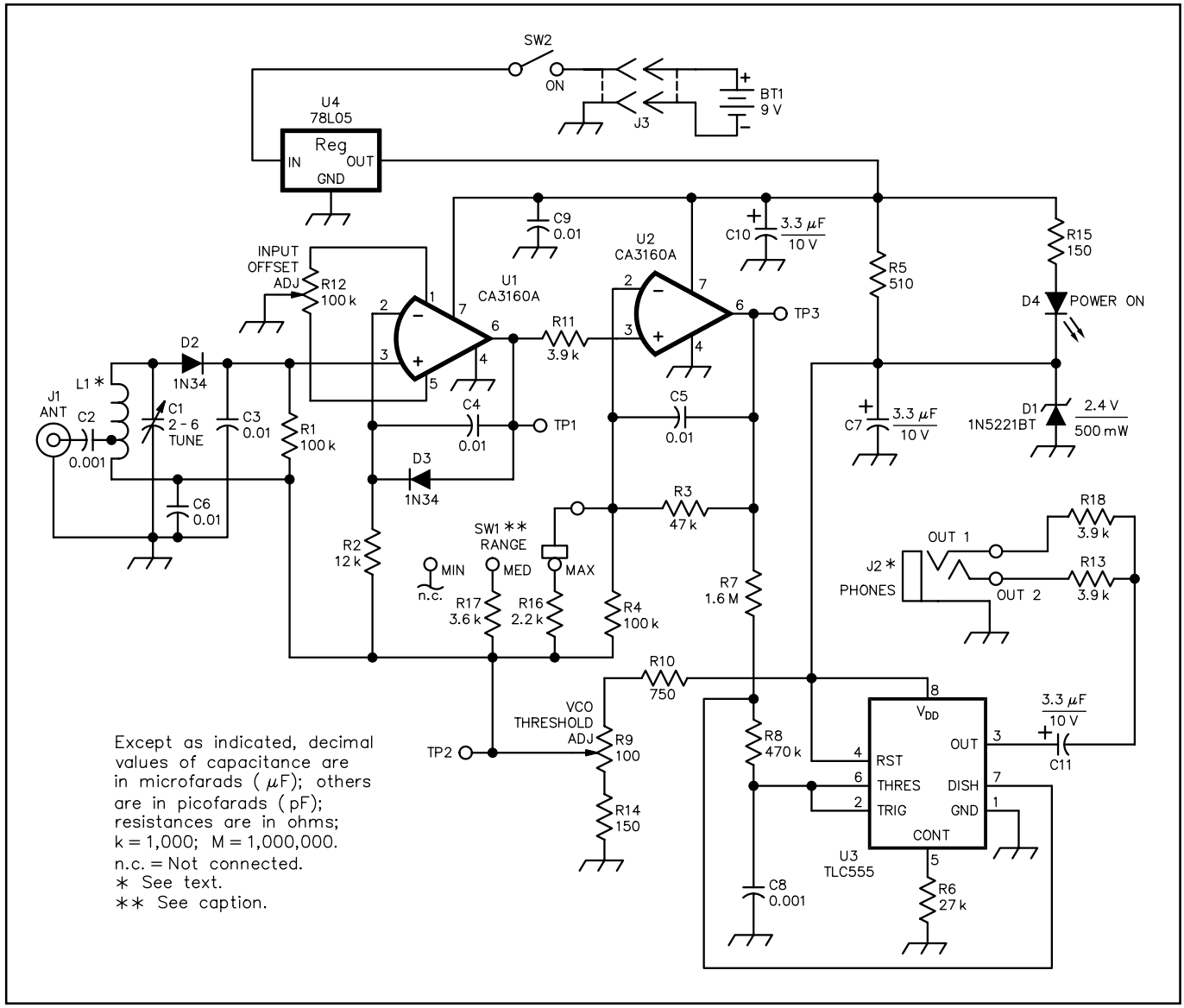


Figure 1—Schematic of the FoxFinder circuit. Unless otherwise specified, resistors are 1/4-W, 5%-tolerance carbon-composition or metal-film units. DK part numbers in parentheses are Digi-Key (Digi-Key Corp, 701 Brooks Ave S, Thief River Falls, MN 56701-0677; tel 800-344-4539, 218-681-6674, fax 218-681-3380; www.digikey.com); RS part numbers are RadioShack (RadioShack.com, PO Box 1981, Fort Worth, TX 76101-1981; tel 800-843-7422; fax 800-813-0087; www.radioshack.com). Equivalent parts can be substituted; n.c. indicates no connection. (The designators for D4, SW1 and SW2 deviate from *QST* style.)

C1—2-6-pF ceramic trimmer (DK SG1021)
C2, C8—0.001 µF, 50 V ceramic (DK P4937)
C3-C6, C9—0.01 µF, 50 V ceramic (DK P4922)
C7, C10, C11—3.3 µF, 10V tantalum (DK P2035)
D1—1N5221 2.4 V, 500 mW Zener (DK 1N5221BMSCT)
D2, D3—1N34A (RS 900-6232); component matching required, see text.
D4—Red LED (DK 160-1078)
J1—Chassis-mount BNC jack (DK ARFX1064)
J2—Chassis-mount, three-circuit (stereo), 3.5-mm jack (RS 910-0768)
J3—9-V battery connector (DK BS6I-HD)
L1—6 turns #21 wire wound on a 3/8-inch diam. form, with a total coil length of 1 inch; see text.
R9—100 Ω trimmer (DK 3306P-101)
R12—100 kΩ trimmer (DK CT9W104)
SW1—DP3P slide switch (DK SW334); one pole unused
SW2—SPST toggle (RS 900-6973)
U1, U2—CA3160AE (DK CA3160AE)
U4—UA78L05 (DK LM78L05ACZ)
U3—TLC555 or LMC555CN (DK LMC555CN)
Misc: 12 inches of #20 wire, hardware, PC board, 8-pin IC sockets (RS 900-5738), 1.1×2.4×4.4-inch (HWD) enclosure (DK HM103), slide-switch topper button (DK SW149)

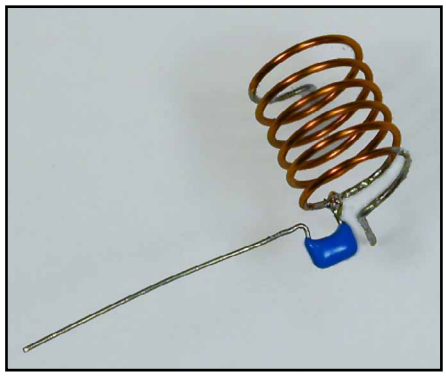
iting resistors R13 and R18. Having two current-limiting resistors in the circuit allows use of stereo or mono headphones; you can omit R18 if you intend to use only mono phones.

A regulated supply voltage from U4 provides circuit stability as the battery voltage changes over its useful life. Zener regulator D1 supplies voltage to the VCO and the threshold-adjusting circuit. LED D4 takes advantage of the current supply to D1 to provide a power-on indication without impacting the battery life. In typical use, a battery lasts longer than one year.

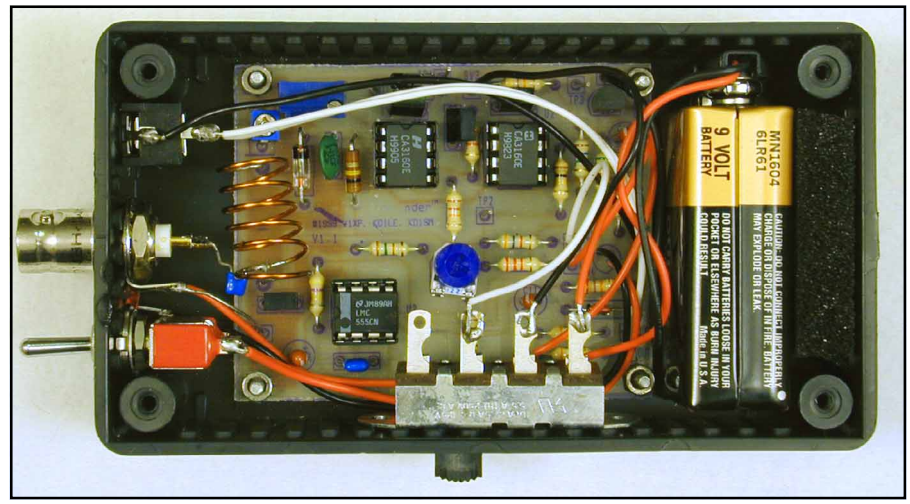
FoxFinder Construction

Now that you're convinced you want one, we'll tell you how to build your own. All components are readily available from the listed suppliers. A drilled and silk-screened PC board, with or without a complete set of parts, is available.[4]

Besides the usual good practice of keeping circuit connections short and direct, the only areas requiring attention are the coil and RF-detector wiring. Use short, direct leads for the coil, tuning capacitor,



L1 ready to go, complete with C2 tapped at 1 turn.



An inside view of the completed unit. J1, J2 and SW2 are to the left. The RANGE switch is at the bottom. One lug of the RANGE switch (MIN) is unconnected.

D2 and D3 and the connection to the coax connector. Be careful when soldering the RF-detector diodes: They are *germanium* diodes and more heat sensitive than silicon diodes. It is important that *germanium* diodes be used in the detector circuit. Silicon diodes such as 1N914s or 1N4148s are *not* suitable substitutes. RadioShack sells a package of 1N34 diodes (RS 276-1123). If you follow the schematic during construction and use the alignment procedure provided later, you should be able to easily duplicate the FoxFinder.

Case Selection

We selected a plastic case for its low cost and weight, and because metal boxes are darn cold to hold in the winter! The shielding qualities of a metal case are not required. The case must, however, be *opaque* because the typical 1N34 glass-encased diodes are light sensitive. Depending on your building skill and experience, you might want to consider using a slightly larger case than the one we chose so you have a bit more room for the parts. The layout shown in the photo is suggested for a "dead-bug" circuit as well, with the coil, RF detector diodes and IC located close to the tuning capacitor. The coil tap is at the end of the coil farthest from the diode connection.

The Coil

Wind the coil on a $^3/_8$-inch form (a drill-bit shank or dowel). The wire need not be enameled, but if it isn't, you must use care to avoid shorting turns and ensure that nothing touches the coil to short it out. A tap point is needed one turn in from one end of the coil for attachment to the coupling capacitor. (If you use enameled wire for the coil, be sure to scrape off the enamel coating before soldering the connection.) While the coil is still on the form, spread the coil turns evenly to a width of one inch. Remove the form and mount the coil, making a direct connection from the end of the coil farthest from the tap point to the tuning capacitor, C1. Be sure to mount the tuning capacitor so you can adjust it later. Connect D2 between the coil and C3 with short, direct leads. We suggest building this part of the circuit on a small piece of copper-clad board even if you build the rest of the circuit on perf board.

Matching the Diodes

The 1N34 diodes should be matched to reduce temperature effects on the calibration. You can sort a group of diodes by connecting a 1-MΩ resistor in series with the diode (forward biased) across a 9-V battery. Using a voltmeter with millivolt resolution, measure the forward voltage drop across each diode and select two diodes having similar voltage drops. (It takes a few seconds for the voltage to stabilize after applying voltage to the diode.) You should be able to find two diodes that have voltage drops within a few millivolts of each other.

Wiring the rest of the circuit is easy. Mount the supply pin bypass capacitors close to their respective ICs. Be sure to provide suitable connection points (scraps of wire will do) for the three test points (TP1-TP3) so that they can be accessed easily without shorting to the surrounding components. The test points are used during alignment of the FoxFinder. Also ensure easy access to pots R9 and R12 for the alignment process.

Alignment

For the following procedure, you'll need a high-impedance digital or analog voltmeter and a 2-meter signal source (such as an H-T). If at anytime you do not obtain the expected results, you will have to troubleshoot the circuit. After fixing the problem, start the alignment procedure from the beginning.

1. Connect the battery and turn on the **POWER** switch. The LED should light indicating that power is applied.

As mentioned earlier, the 1N34 diodes are sensitive to bright light. During alignment, shade the diodes from any bright light; normal room lighting usually is okay. (This precaution is necessary only while adjusting R9 and R12.)

2. Place the **RANGE** switch in the **MAX** position. Connect the positive lead of a dc voltmeter to TP2 and connect the voltmeter's negative lead to the coax connector shell. (This is a handy place to make a ground connection.) Adjust R9 for a reading of +0.5 V. The exact value is not critical at this step; R9 will be readjusted in Step 3. Next, connect the voltmeter's positive lead to TP1 and connect the negative lead to TP2. Adjust R12 for an indication of about +7 mV. Again, the exact value isn't critical at this time, but you should be able to adjust this voltage through zero. It is important that the voltage be *positive*. If you can't get a level of +7 mV, check for a wiring error, a defective component or an incorrectly installed component.

Move the voltmeter's positive lead from TP1 to TP3, leaving the negative lead on TP2. Ensure that the **RANGE** switch is in the **MAX** range position. Carefully adjust R12 for a dc voltage of +50 mV ±5 mV. Use the most sensitive voltmeter scale that is appropriate. Again, it is important that the voltage is *positive*. Remove the test leads.

3. Connect the positive voltmeter lead to TP1 and the negative lead to the coax connector ground shell. As a signal source, set up a 2-meter rig on a clear frequency with a low power-output level (100 mW to 1 W). It is not necessary to

have an antenna on the FoxFinder. With the rig within a few feet of the FoxFinder, transmit and observe the voltage on the voltmeter. The voltage should increase in magnitude. It is the *increase* that is important. If the voltage increases in magnitude continue with the alignment. If the voltage *decreases*, it indicates that D2 is not installed properly. Unkey the rig, correct the problem and repeat the entire alignment procedure.

Connect the negative voltmeter lead to the cathode (banded) end of D3. Key the rig. The voltage measured this time should be well below 1 V. A voltage greater than 1 V indicates that D3 is either installed backward or defective. Correct this before proceeding, then repeat the entire alignment procedure. If everything tests correctly, remove the test leads and proceed to Step 4.

4. Plug a pair of headphones into headphone jack J2. With the rig unkeyed and the **RANGE** switch still in the **MAX** position, you should hear an audio tone in the headphones. If not, adjusting R9 should provide an audio tone in the headphones. While adjusting R9, note that at some point the tone becomes very low pitched and then oscillation stops. The correct adjustment of R9 is just beyond the point where oscillation starts with the **RANGE** switch in the **MAX** position. Moving the **RANGE** switch to the center position should stop the oscillation. This indicates a proper adjustment of the detection threshold.

5. RF alignment is next. Connect an antenna (a "rubber duck" will do) to the FoxFinder RF connector. Set the rig on a frequency close to the intended fox frequency and make a short transmission with the **RANGE** switch in the **MAX** position. The audio tone in the headphones should increase in pitch. With the help of an assistant, increase the separation between the rig and the FoxFinder so that the change in pitch is not too great when the rig is transmitting. Now, carefully adjust C1 for the highest pitch. This is the point of maximum sensitivity. Unkey the rig.

6. Turn off power to the FoxFinder and install the case cover. Assembly is complete and you can congratulate yourself on a job well done! As with any fine tool, you now need to practice using it. We are sure you will be pleased with your FoxFinder and will have many happy hours hunting with it.

Summary

Your FoxFinder is sure to add to your enjoyment of the great sport of hidden transmitter hunting! Our FoxFinders have saved us countless hours and given us confidence that we *can* find the elusive fox!

Notes

[1]Pete Ostapchuk, N9SFX, "Fox Hunting is Practical and Fun!,"*QST*, Oct 1998, pp 68-69.

[2]Dale Hunt, WB6BYU, "Amateur Radio Direction Finding—The 1998 IARU World Championships," *QST*, May 1999, pp 28-31.

[3]Roy Lewallen, W7EL, "A Simple and Accurate QRP Directional Wattmeter," *QST*, Feb 1990, pp 19-23, 36.

[4]Drilled, silk-screened PC boards and full kits (including a PC board, all parts, enclosure and an assembly manual) are available. Send all orders to the Nashoba Valley Amateur Radio Club, PO Box 900, Pepperell, MA 01463. Address any questions to **nvarc_n1nc@arrl.net**. Prices in the US: PC board, $10 postpaid; kit, $59.95 plus $5 shipping and handling. All US orders are shipped by First Class mail. Personal checks and money orders accepted for US orders. For shipments outside United States, payment must be in US currency by bank check or money order. PC board, $14 postpaid. For surface delivery of a kit, $59.95 plus $9 shipping and handling (expect a total of six to eight weeks delivery time). For kit air delivery, shipping and handling is $12, with an expected delivery time of two to three weeks.

First licensed in 1955 as KN9AQP, Bob Reif, W1XP, has been an active amateur ever since. He is an Extra Class license holder and an ARRL Life Member. In 1963 he earned his BSEE from Purdue University. After two years active duty in the US Army, Bob joined GTE in Waltham, Massachusetts, in 1966. During the next 30 years, he was involved in many areas of military communication: analog, RF and antenna design. Since retiring in 1994, Bob has spent more time enjoying Amateur Radio. During his 45-plus years as a ham, he has worked MF, HF, VHF, UHF and SHF to 10 GHz. Bob likes to design and build equipment and antennas. You can contact Bob at PO Box 363, Groton, MA 01450; **w1xp@arrl.net** *and* **nvarc_n1nc@arrl.net**.

Since the age of seven, Ralph Swick, KD1SM, has had a consuming interest in all things with wires and electrons. However, even with electronics as a hobby, it wasn't until his own son expressed interest in Amateur Radio that Ralph got his ticket. Ralph has BS degrees in physics and mathematics. His career involves designing computer software and protocols. Having worked in industry and academia, Ralph is presently on the research staff at the MIT Laboratory for Computer Science. You can contact Ralph at 113 Townsend Harbor Rd, Lunenburg, MA 01462; **kd1sm@arrl.net**.

Stan Pozerski, KD1LE, has been a ham since 1992 and holds an Amateur Extra license. He has a BS degree in computer systems with a minor in business management. For 25 years, Stan worked in defense industry electronics and industrial manufacturing. He now works as a network and systems administrator for the Mitsubishi Electric Research Laboratory. In addition to fox hunting, Stan enjoys mobile and fixed-station HF CW, and traffic handling. You can contact Stan at PO Box 527, Pepperell, MA 01463; **kd1le@amsat.org**.

Photos by the authors

NEW PRODUCTS

GPS/VHF MOBILE ANTENNA FROM ANTENEX

◊ Antenex Inc has recently made available a combination GPS/VHF antenna that should be well suited for APRS applications.

The Antenex Model GPSDVHF antenna consists of a compact cylindrically shaped base containing an active ceramic patch GPS receive antenna (power is supplied from your GPS receiver through the feed line). A tunable (138-148 MHz) $^1/_4$-λ 0.1-inch diameter stainless steel whip with a tapered shock spring base, finished in black chrome, is mounted on top.

The antenna system requires a $^5/_8$-inch mounting hole and is secured via a solid brass stud and a stainless steel jam nut.

The GPSDVHF comes with 14 feet of RG-174 for the GPS receiver and 14 feet of RG-58A/U for VHF. A crimp-on SMB connector and an N connector, for installation by the user, are provided.

For more information on the GPSDVHF and the entire line of Antenex antennas, antenna mounts and antenna related products, visit your favorite Amateur Radio equipment dealer or contact Antenex, 2000-205 Bloomingdale Rd, Glendale Heights, IL 60139; tel 800-323-3757 or 630-351-9007, fax 630-351-9009; **www.antenex.com**.

Previous • Next New Products

By Joe Everhart, N2CX

The NJQRP Squirt

This reduced-size 80-meter antenna is designed for small building lots and portable use. It's a fine companion for the Warbler PSK31 transceiver.

At one time, 80 meters was one of the more highly populated amateur bands. Lately, it has become significantly less popular because much DXing has moved to the higher frequencies and many suburban lot sizes are too small to accommodate a full 130-foot, λ/2 antenna for the band. That's unfortunate, because 80 meters has lots of potential as a local-communication band—even at QRP levels. The recently published Warbler PSK31 transceiver can serve as a great facilitator for close-in QRP communication without much effort.[1] What's really needed to complement the Warbler for this purpose is an effective antenna that fits on a small suburban plot. Because PSK31 (which the Warbler uses) is reasonably effective even with weak signals, we can trade off some antenna efficiency for practicality.

What's a Ham to Do?

I investigated a number of antenna possibilities to come up with a practical solution. One intriguing candidate is the magnetic loop. Plenty of design information for this antenna is presented in *The ARRL Antenna Book* and at a number of Web sites.[2, 3] To obtain high efficiency, however, the loop must be 10 feet or more in diameter and built from 1/2-inch or larger-diameter copper pipe. The loop needs a very low-loss tuning capacitor and a means of carefully tuning it because of its inherently narrow bandwidth. Another configuration, the DCTL, may be a solution, but it's likely not very efficient.[4]

An old standby antenna I considered is the random-length wire worked against ground. If it is at least λ/4 long (a Marconi antenna) or longer, it can be reasonably efficient. Shorter lengths are likely to be several S units down in performance and almost any length end-fed wire needs a significant ground system to be effective. Of course, you may not need much of a ground with a λ/2 end-fed wire, but it's as long as a center-fed dipole.

Vertical antennas don't occupy much ground space, but suffer the same low efficiency as the end-fed wire if they are practical in size.

Probably the easiest antenna to use with good, predictable performance is the horizontal center-fed dipole. Unfortunately, as mentioned earlier, the usual 80-meter λ/2 dipole is too large for many lots. But all is not lost! The dipole can be reduced to about a quarter wavelength without much sacrifice in operation (see the sidebar, "Trade-Offs"). Furthermore, if the dipole's center is elevated and the ends lowered—resulting in an inverted **V**—it takes up even less room. This article describes just such a dipole: the NJQRP Squirt.

V for Victory

You can think of the Squirt as a 40-meter, λ/2 inverted-**V** dipole being used on 80 meters. Figure 1 is an overall sketch of the antenna; Figure 2 is a photograph of a completed Squirt prior to erection. The Squirt has two legs about 34 feet long separated by 90° with a feed line running from the center. When installed, the center of the Squirt should be at least 20 feet high, with the dipole ends tied off no lower than seven feet above ground. This low antenna height emphasizes high-angle NVIS (Near Vertical-Incidence Skyware) propagation that's ideal for 80-meter contacts ranging from next door out to 150 or 200 miles. And

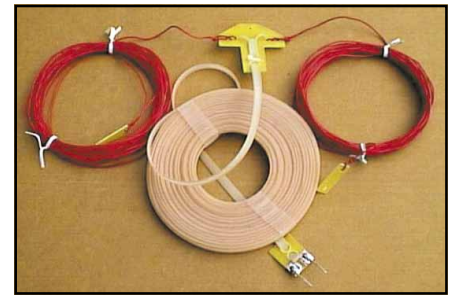


Figure 2—An assembled Squirt ready for installation.

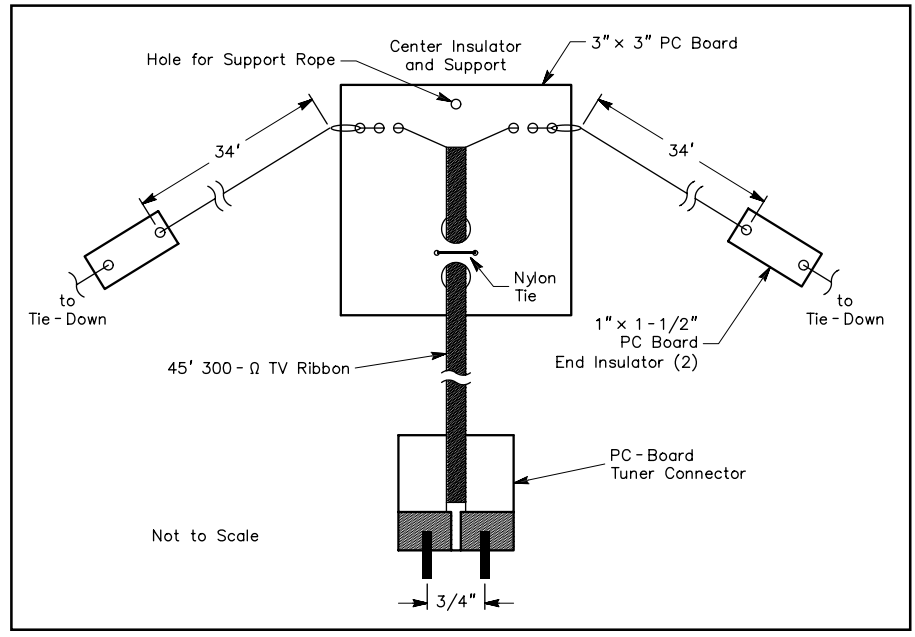


Figure 1—General construction of the 80-meter Squirt antenna.

[1]Notes appear on page 43.

that's where 80 meters shines! With the Squirt's center at 30 feet and its ends at seven feet, the antenna's ground footprint is only about 50 feet wide.

One nice feature of a λ/2 center-fed dipole is that its center impedance is a good match for 50- or 75-Ω coax cable (and purists usually use a balun). Ah! But the Squirt is only λ/4 long on 80 meters, so it *isn't* resonant! Its feedpoint impedance is resistively low and reactively high. This means that feeding the antenna with coax cable would create a high SWR causing significant feed-line loss. To circumvent this, we can feed the antenna with a low-loss feed line and use an antenna tuner in the shack to match the antenna system to common 50-Ω coax cable. I'll have more to say about the tuner later.

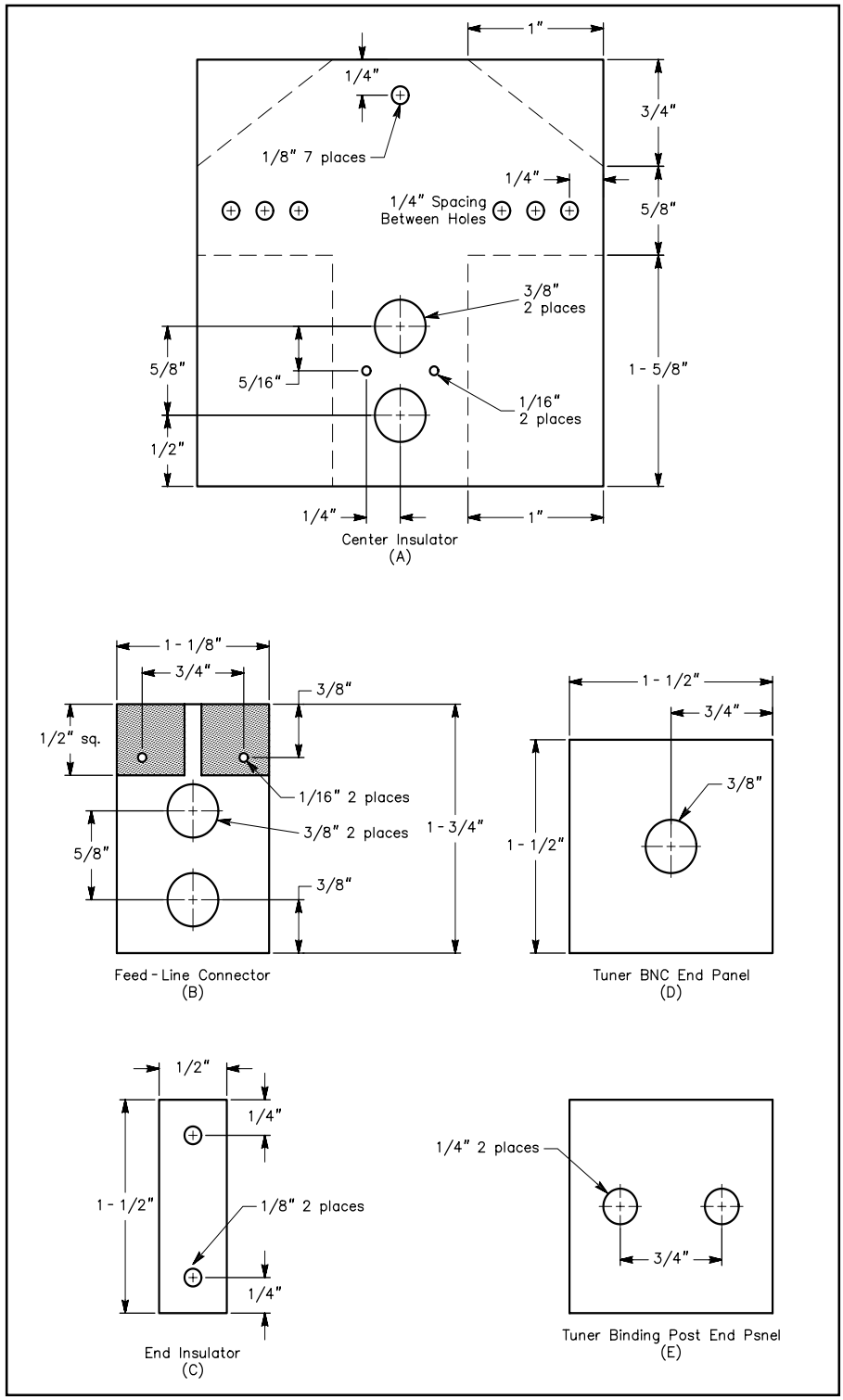


Figure 3—Hole sizes and locations for the various PC-board pieces. See Note 5.

I use 300-Ω TV flat ribbon line for the feed line. Although a better low-loss solution is to use open-wire line, that stuff is not as easy to bring into the house as is TV ribbon. Using TV ribbon sacrifices a little transmitted signal for increased convenience and availability. If you feel better using open-wire line, go for it!

Using Available Materials

It's always fun to see what you can do with junkbox stuff, and this antenna is one place to do it. See the "Parts List" for information on materials and sources.[5] For instance, the end and center insulators (see Figure 1) are made of 1/16-inch-thick scraps of glass-epoxy PC board. For the antenna elements, I use #20 or #22 insulated hookup wire. Although this wire size isn't recommended for use with fixed antennas, I find it entirely adequate for my Squirt. Because it's installed as an inverted **V** antenna, the center insulator supports most of the antenna's weight making the light-gauge wire all that's needed. The small-diameter wire has survived quite well for several years at N2CX. This is not to say, of course, that something stronger like #14 or #12 electrical house wire couldn't serve as well.

The 300-Ω TV ribbon can be purchased at many outlets including RadioShack and local hardware stores. Once again, if you want to use heavier-duty feed line, do so. The only proviso is that you may then have to trim the feeder length to be within tuning range of the Squirt's antenna tuner.

The End Insulators

I used 1/2×1 1/2-inch pieces of 1/16-inch PC board for the Squirt's two end insulators. As with everything else with the Squirt, these dimensions are not sacred; tailor them as you wish. If you use PC board for the end insulators, you have to remove the copper foil. This is easy to do once you've gotten the knack. Practice on some scraps before tackling the final product. The easiest way to remove the foil without etching it is to peel it off using a sharp hobby knife and needle-nose pliers. Carefully lift an edge of the foil at a corner of the board, grasp the foil with the pliers and slowly peel it off. You should become an expert at this in 10 or 15 minutes. Drill 1/8-inch-diameter holes at each end of each insulator for the element wires and tie-downs.

Tuner Feed-Line Connector

The tuner end of the feed line is terminated in a special connector. Because the TV-ribbon conductors aren't strong, they'll eventually suffer wear and tear.

Trade-Offs

One of the unfortunate consequences of shrinking an antenna's size is that its electrical efficiency is reduced as well. A full-size dipole is resonant with a feedpoint impedance that matches common low-impedance coax quite well. This means that most transmitter power reaches the antenna minus only 1 dB or so feed-line loss. However, when the antenna is shortened, it is no longer resonant. A *NEC-4* model for the Squirt shows that its center impedance on 80 meters is only about 10 Ω resistive, but also about 1 kΩ capacitive. This is a horrendous mismatch to 50-Ω cable, and feed-line loss increases dramatically with high SWR. The Squirt uses 300-Ω TV ribbon for the feed line with an inherently lower loss than coax. This loss is much less than if coax were used, but it's still appreciable. Calculated loss with 300-Ω transmitting feed line is about 7.7 dB (loss figures are hard to come up with for receiving TV ribbon) so the feed line used doubtless has more than that.

Although this sounds discouraging, it's *not fatal*. You have to balance losing an S unit or so of signal against not operating at all! Consider that the Squirt, even with its reduced efficiency, is still better than most mobile antennas on 40 and 80 meters. So for local communication (a low-dipole's forte), using PSK31 and the Squirt is quite practical.

If you don't already have an antenna, the Squirt's a good choice to get your feet wet when using PSK 31. Once you get hooked, you'll probably want a better antenna. If you have the room, put up a full-size dipole; you'll see the improvement right away. If you can't do that, use a lower-loss feeder on the Squirt, such as good-quality open wire.—*Joe Everhart, N2CX*

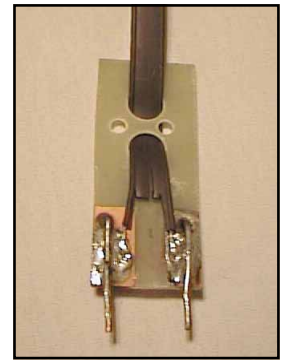


Figure 4—The pad side of the home-made feed-line-to-tuner connector.

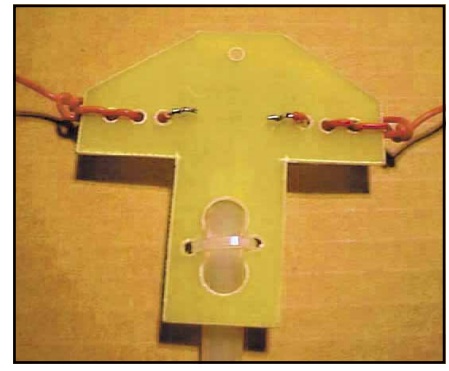


Figure 5—Here the feed-line-to-tuner connector is shown attached to the binding posts of the Squirt antenna tuner.

This connector provides needed mechanical strength and a means of easily attaching the feed line to the tuner. In addition to some PC-board material, you'll need four or five inches of #18 to #12 solid, bare wire. Refer to Figure 3 and the accompanying photographs in Figures 4 and 5 for the following steps.

Take a $1^1/_8 \times 1^3/_4$-inch piece of single-sided PC board and score the foil about $^1/_2$ inch from one end; remove the $1^1/_4$-inch piece of foil. Now score the remaining foil so you can remove a $^1/_8$-inch-wide strip at the center of the board, leaving two rectangular pads as shown in Figures 3B and 4. Drill two $^1/_{16}$-inch-diameter holes in the copper pads spacing the holes about $^3/_4$-inch apart. Drill two $^3/_8$-inch holes at the connector midline about $^5/_8$-inch apart, center to center, to pass the feed line and secure it.

Cut two pieces of #18 to #12 wire each about three inches long. Pass one wire through one of the $^1/_{16}$-inch holes in the connector board and bend over about $^1/_4$-inch of wire on the nonfoil side. Solder the wire to the pad on the opposite side and cut the wire so that about one inch of it extends beyond the connector. Repeat this procedure with the second wire. Next, strip about two inches of webbing from between the feed-line conductors and loop the feed line through the two $^3/_8$-inch holes so that the free ends of the two conductors are on the copper-pad side. Strip each lead and solder each one to a pad. You now have a solid TV-ribbon connector that mates with the binding-post connections found on many antenna tuners. Figure 6 shows the connector mated with a Squirt tuner.

Center Insulator

Strip all the foil from this 3-inch-square piece of board. Use Figure 3A as a guide for the hole locations. The top support hole and the six wire-element holes are $^1/_8$-inch in diameter; space the wire-element holes $^1/_4$-inch apart. The feed-line-attachment holes are $^3/_8$-inch diameter spaced $^1/_2$-inch apart, center to center; the two holes alongside the feed-line-attachment holes are $^1/_{16}$-inch diameter. These $^1/_{16}$-inch holes accept a plastic tie to secure the feed line. I trimmed the insulator shown in Figure 2 from its original 3-inch-square shape to be more esthetic. Your artistic sense may dictate a different pattern.

Bevel all hole edges to minimize wire and feeder-insulation abrasion by the glass-epoxy material. You can do this by running a knife around each hole to remove any sharp edges.

Putting It All Together

The Squirt is simple to assemble. Once all the pieces have been fabricated, it should take no more than an hour or two to complete assembly. Begin with the center insulator. Cut each of the two element wires to a length of about 34 feet. Feed the end of one wire through the center insulator's outer hole on one side, then loop it back and twist around itself outside the insulator to secure it. Now loop it through the other two holes so that the inner end won't move from normal movement of the wire outside the insulator. Repeat the process for the other insulator/wire attachment. Separate several inches of the TV-ribbon feed-line conductors from the webbing; leave the insulation intact except for stripping about $^1/_2$ inch from the end of each wire. Pass the TV ribbon through both $^3/_8$-inch holes. Strip a $^1/_2$-inch length of insulation from each dipole element, then twist each feeder wire and element lead together and solder the joints. It might be prudent also to protect the joint with some non-contaminating RTV or other sealant. Finally, loop a nylon tie through the holes alongside the feeder and tighten the tie to hold the feeder securely. A close-up of the assembled center insulator is shown in Figure 6.

Attach the end insulators to the free ends of the dipole wires by passing the wires through the insulator holes and twisting the wire ends several times to secure them.

So that the antenna/feed-line system can be tuned with the Squirt tuner, the 300-Ω feed line needs to be about 45 feet long. If you use a different tuner, you may have to make the feed line longer or shorter to be within that tuner's impedance-adjustment range.

Tuner Assembly

This tuner (see Figures 7 and 8) is about as simple as you can get. It's a basic series-tuned resonant circuit link-coupled to a coaxial feed line. At C1, I use a 20 to 200-pF mica compression trimmer acquired at a hamfest (you *do* buy parts at hamfests, don't you?), although almost any small variable capaci-

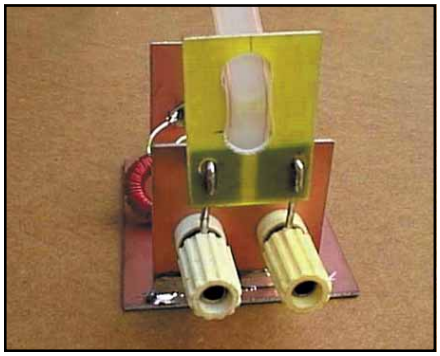


Figure 6—View of an assembled center insulator fashioned from a 3×3-inch piece of PC board from which all the foil has been removed.

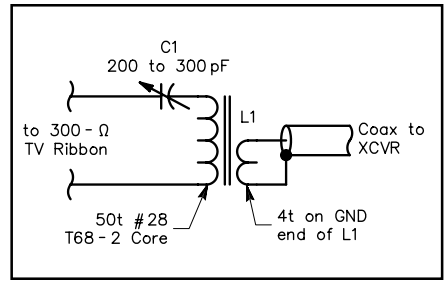


Figure 7—Schematic of the Squirt antenna tuner. See the accompanying Parts List.

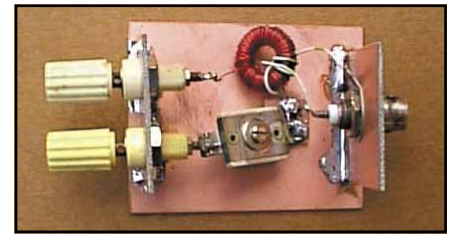


Figure 8—This Squirt tuner prototype uses a 2×3-inch piece of PC board for the base plate, two 1½×1½-inch pieces for end plates and a ½-inch square piece as a tie point for the toroid and tuning capacitor.

tor of this value should serve. The inductor, L1, consists of 50 turns of enameled wire wound on a T68-2 iron-core toroidal form. An air-wound coil would do as well, although it would be physically much larger. Figure 8 shows the tuner built on an open chassis made of PC board. My prototype uses several PC-board scraps: a 2×3-inch piece for the base plate, two 1½×1½-inch pieces for each end plate (refer to Figure 3). A ½-inch square piece of PC board (visible just beneath the capacitor in Figure 8) is glued to the base plate to serve as an insulated tie point for the connection between the toroid (L1) and tuning capacitor (C1). The tuner end plates are soldered to the base plate to hold a pair of five-way binding posts and a BNC connector at opposite ends. L1 and C1 float above electrical ground, connected to the TV ribbon. One end of L1's secondary (or link) is grounded at the base plate and the coax-cable shield. The hot end of L1's secondary winding is soldered to the coax-connector's center conductor.

Parts List

Squirt Antenna

Numbers in parentheses refer to vendors presented at the end of the list.

1—3×3-inch piece of 1/16-inch-thick glass-epoxy PC board for the center insulator (1)
2—½×1½-inch pieces of PC board for the end insulators (1)
1—1⅛×1¾-inch piece of PC board for the feed-line connector (1)
2—34-foot lengths of #20 (or larger) insulated hookup wire (2)
1—6-inch length of #16 (or larger bare) copper wire; scrounge scraps from your local electrician.
1—45-foot length of 300-Ω TV ribbon line (2)

Squirt Tuner

1—2×3-inch piece of PC board for base plate (1)
2—1½-inch-square pieces of PC board for end plates (1)
1—½-inch-square piece of PC board for the tie point (1)
1—200- to 300-pF (maximum) mica compression trimmer (3)
1—T68-2 toroid core (3)
2—Five-way binding posts (2)
1—55-inch length of #26 or 28 enameled wire (2 and 3)

Note: You can use 3/16-inch-thick clear Plexiglas for the Squirt's end and center insulators. Commonly used as a replacement for window glass, Plexiglas scraps can be obtained at low cost from hardware stores that repair windows.

Vendors

1. HSC Electronic Supply, 3500 Ryder St, Santa Clara, CA 95051; tel 408-732-1573, **www.halted.com**
2. Local RadioShack outlets or **www.RadioShack.com**
3. Dan's Small Parts and Kits, Box 3634, Missoula, MT 59806-3634; tel 406-258-2782; **www.fix.net/~jparker/dans.html**

Tuner Testing

C1 tunes sharply, so it's a good idea to check just how it tunes before you attach the tuner to an antenna. You can simulate the antenna by connecting a 10-Ω resistor across the binding posts. If you use an antenna analyzer as the signal source, a ¼-W resistor such as the RadioShack 271-1301 is suitable. But if you use your QRP transmitter, you need a total resistance of 8 to 10 Ω that will dissipate your QRP rig's output, assuming here it's 5 W or less. Four RadioShack 271-151 resistors (two series-connected pairs of two parallel-connected resistors) provide a satisfactory load if you don't transmit for extended periods. Or, you can make up your own resistor arrangement to deliver the proper load. Adjust C1 with an insulated tuning tool to achieve an SWR below 1.5:1.

Once the tuner operation is verified using the dummy antenna, it's ready to connect to the Squirt. Tuning there will be similarly sharp, and a 2:1 SWR bandwidth of about 40 kHz or so can be expected as normal.

A Multiband Bonus

Although the Squirt was conceived with 80-meter operation in mind, it can double as a multiband antenna as well. The simple Squirt tuner is designed to match the antenna only on 80 meters. However, a good general-purpose balanced tuner such as an old Johnson Matchbox or one of the currently popular Z-match tuners (such as an Emtech ZM-2) will give good results with the Squirt on any HF band. The Squirt prototype was recently pressed into service at N2CX on 80, 40, 30, 20 and 15 meters for several months. It worked equally as well as a similar antenna fed with ladder line. Although no extensive comparative tests were done, the Squirt has delivered QRP CW contacts from coast to coast on 40, 20 and 15 meters and covers the East Coast during evening hours on 80 meters.

Build one! I'm sure you'll have fun building and using the Squirt!

Notes

[1]Dave Benson, NN1G, and George Heron, N2APB, "The Warbler—A Simple PSK31 Transceiver for 80 Meters," *QST*, Mar 2001, pp 37-41.
[2]R. Dean Straw, N6BV, *The ARRL Antenna Book* (Newington: ARRL, 1997, 18th ed), pp 5-9 to 5-11.
[3]**www.alphalink.com.au/~parkerp/nodec97.htm**; **www.home.global.co.za/~tdamatta/loops.html**
[4]**home.earthlink.net/~mwattcpa/antennas.html**
[5]Full-size templates are contained in SQUIRT.ZIP available from **www.arrl.org/files/qst-binaries/**.

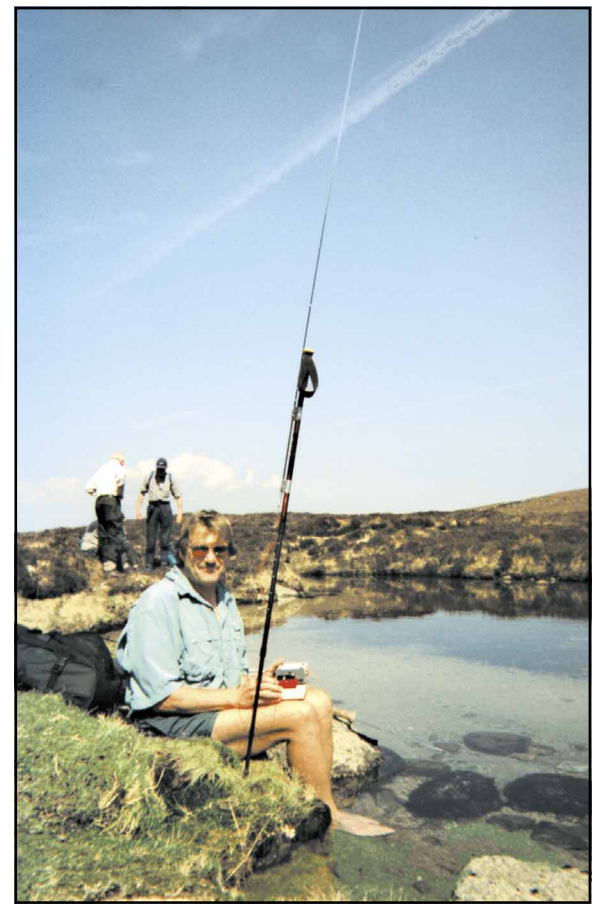
You can contact Joe Everhart, N2CX, at 214 New Jersey Rd, Brooklawn, NJ 08030; **n2cx@arrl.net**.

Photos by the author

By Stephen Stuntz, N0BF

A QRP 'Expedition' to Great Britain

Remote atolls aren't the only places that attract ham adventurers. With two tiny radios and a pair of innovative "stick" antennas, the author hiked high and low across the British countryside, working local hams and making friends the whole time. It was a decidedly civilized expedition!



The author fishes for QRP contacts on the Island of Arran in Scotland.

I spotted Vic's two-element beam from Conway Square on a hill near the HF Holiday house, where my wife, Jeannie, and I were staying with 32 of our Colorado Mountain Club (CMC) friends. After knocking on his door and identifying myself as a fellow ham from across the pond, he invited me in and poured two glasses of homemade red wine. While sipping, we exchanged stories like old friends.

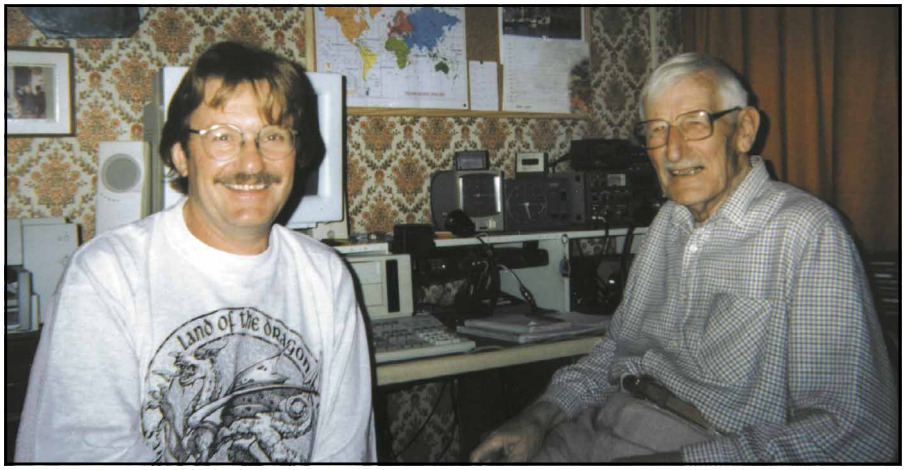
Conway Castle—as viewed through Vic's picture window—looked powerful and foreboding. King Edward built it in 1200 to protect the northeast coast of Wales from medieval marauders. Nowadays, tourists invade curio shops in the small village surrounded by high stone walls on the west, Conway Bay on the east and the old castle on the north. Vic told me that he'd come here with his wife Louise after retiring from a job in Manchester, England, so he could sail his yacht and enjoy ham radio. He had conveniently purchased a house from another ham who had installed an HF Yagi, a G5RV wire antenna and a large 2-meter beam. All he had to do was plug in his Kenwood TS-520 and Yaesu FT-2600 transceivers and GW0MOJ was in business!

Vic was intrigued by the QRP rigs I'd brought along on our Great Britain hiking vacation, which was arranged by the HF Holiday tour company (one week in Scotland on the Island of Arran and one week in Wales). A month before leaving Colorado, I built an MFJ "Cub," a 15-meter QRP CW transceiver and mounted it upside-down in an enclosure (RadioShack 270-213) containing nine AA batteries. A Whitebrook MK-61 keyer was also mounted on the enclosure to complete the first rig. The second rig was a 200-mW Standard C-108 2-meter FM transceiver powered by two AA batteries.

I modified two hiking sticks to do double duty as antenna masts by attaching 72-inch telescoping antennas (Radio Shack 270-1408) to each stick with stand-off insulators made from two wine corks and held in place with duct tape. Fully extended, each stick/whip becomes a quarter-wave antenna section on 15 meters—after connecting a five-foot wire to the Cub's antenna connector, that is. They also serve as three-quarter wavelength antenna sections on 2 meters when extended to 57 inches and fed by miniature coax from the C-108. The antenna can be configured as a vertical, a dipole, or any convenient orientation allowed by the landscape.

The Cub worked flawlessly on the first day we hiked on the Island of Arran. During lunch break, I set up the hiking stick antenna in a vertical configuration on the grassy hill overlooking Brodick Bay, with Goatfell (Arran's highest mountain) towering 3000 feet in the background. Both telescoping antennas on each hiking stick were fully extended. The vertical element was made by jabbing one stick into a moist clump of grass and the ground radial was made by laying the remaining stick on the ground. The Cub's antenna jack was connected by alligator clips to each element via a five-foot length of wire.

"CQ DE US5IPN" blared from my headphones at 30 WPM. I answered,



The author (left) chats with Vic, GW0MOJ, in his station in Wales.

"DE GM/N0BF/QRP," and Yuri responded with a 559 RST from Doneck, Ukraine. His 25-W signal was booming in at 599. To close our conversation, I told Yuri that our hiking group was finishing lunch and preparing to head down the trail toward our hotel in Lamlash. I packed the Cub back into a fanny pack, compressed the telescoping antennas and reset the sticks for the "walking mode" trek down the trail.

My first attempt to establish a 15-meter QSO during a hike had gone perfectly! Unfortunately, the midday propagation for our remaining six days on the island was extremely poor. I tried to make other QSOs every day during our regular 11 AM rest breaks. Signals were barely audible and often faded into the noise. I did manage to work MM0CIN, operating from Glasgow, 60 miles east of Arran on the mainland. Rick was experimenting with a new loop antenna. He gave me a 559 and was surprised that we could hear each other on 15 meters, considering our proximity.

Two days later, after our group transferred to Wales, I experienced improved performance on 15 meters by operating in the evening. The antenna was erected by leaning one fully extended hiking stick out of a second-story window at a 45-degree angle. The counterpoise was an 11-foot piece of wire dangling out the window down the outside wall. As the sun set over Conway Bay, L99D in Argentina called CQ with a signal that was so loud I could hear it with the volume control turned completely down. A pileup of European stations responded, sounding like a flock of gobbling turkeys. I waited for the frenzy of signals to fade before sending "GW/N0BF/QRP" at 35 WPM. The operator answered with a 599 report! I was still in shock when PY7OI in Brazil came back with another 599 report. Both stations continued to take advantage of the temporary opening between Europe and South America for 30 minutes until all signals faded into the noise.

Pouring more wine, Vic suggested that I monitor the 145.500-MHz simplex calling frequency to meet local hams on 2 meters using my C-108. He led me downstairs to his shack and handed me the mike to his FT-2600. I sent "CQ this is GW/N0BF" and Laurie, GW0MRL, answered from Manchester, England, and suggested we move up to 145.525 MHz. Laurie had been working on his weekly report to the Manchester repeater group when he answered my call.

After Laurie signed off we returned to 145.500 MHz and heard Chris, GW1OIK, calling. I answered as MW/N0BF this time and Chris explained that he was driving to visit his mom at the local hospital. He asked how Vic was coming along with his yacht repairs. Vic told Chris that he was ready to sail on Saturday and was going to ask Jeannie and me to go along. I asked Vic and Chris if we could have a rain check for our next visit to Conway since we were leaving Saturday.

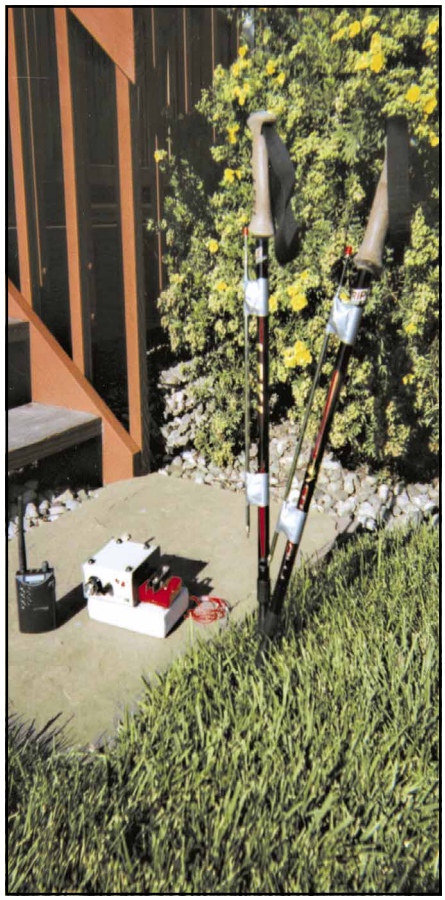
I thanked Vic for his hospitality and promised to bring Jeannie over for a visit before our departure. Feeling a bit tipsy from the wine, I meandered out his front door, through the iron gate, along the worn foot path lined with sweet smelling lilacs and brilliant, purple rhododendron to the HF house.

Jeannie met me in the large dining hall where 70 people (our CMC group plus 40 other mostly British folks) were seated around eight rectangular tables. We were famished after a full day of hiking on Conway Mountain, where we'd followed footpaths used by travelers and traders for more than 1000 years. In the process we crossed 25 rugged stone walls through cleverly designed turnstiles maintained by landowners to allow access by humans while containing the sheep!

Hungry hikers gladly feasted on homemade vegetable soup, freshly baked bread with real butter, hot french fries, string beans, cooked onions, roast pork with gravy and fruit cobbler covered with cream. After stuffing ourselves, we moved very slowly to the meeting room for a steaming cup of British tea and discussion of the next day's activities. Three hikes of varying difficulty levels were being offered, along with a bird watching walk and a van tour.

I sneaked up the stairs to our room with tea in hand, leaned the antenna out the bedroom window and set the C-108

Hiking through the beautiful Welsh countryside.



The essential kit for every QRP adventurer: tiny transceivers and "hiking stick" antennas.

(Left to right) Jim Plumb, N0GTW, Bob Russell, GW3HUJ, and the author meet for coffee.

to scan. On 145.575 simplex, Vic was telling Bob, GW3HUJ, about earlier in the evening when this "young ham dropped in out of the blue from Colorado." I immediately broke in to meet Bob, who was quite excited to tell me that he had just returned from a vacation on the Island of Arran. We chuckled about the irony of how we'd each tried to make a 2-meter QSO from the island, only to contact each other here! In ham radio, you never know when and where paths will cross.

The next three days Jeannie and I walked on more leisurely hikes that allowed more time to submerge in the culture. We dropped into several pubs to sample tea and scones, fish and chips, dark ale, lager beer and, of course, lots of ice cream. In the evenings, we led "sing-alongs" with our friend Elaine. She played her travel violin, Jeannie strummed her guitar and I picked my mandolin while 50 people sang into the night. The British participants enjoyed singing so much they kept asking for more. Back in our room, I checked into the 145.575 simplex net to bid good night to Vic and Bob, a routine I repeated every night just before dropping off to sleep.

Jim Plumb, N0GTW, his wife Shirley, Jeannie and I met Bob at Clements Coffee shop Wednesday morning. Bob enjoyed checking out the QRP rigs and the hiking stick antennas. The waitress accused him of fishing for a cup of coffee with the extended antenna! Bob told us that he had moved to Conway after retiring from a job in Manchester. He was also responsible for Vic moving from Manchester and even found him the house overlooking the Castle.

Hiking 2500 feet up the highest mountain in England and Wales was the climax of our trip. The three-mile trail to the summit was steep and rocky as it traversed a ridge leading to the base of Snowdon Mountain. The trail, which grew steeper as it zigzagged its way to the top, was lined with hikers who were easing their struggle with sticks that looked a lot like mine (sans antennas). The view was breathtaking as we looked down on layers of clouds and jagged mountain ranges stretching to Atlantic Ocean. We walked four miles down along a cog-rail train track to the village of Rhyd-ddu and into a pub for a glass of ale.

That evening between 7 and 9 PM, 15 meters was open and alive with exotic call signs from around the world. I answered CQs from stations with big signals by comparing the volume of the incoming signal with that of the sidetone. As it turned out, I was able to work every station with a signal louder than the side tone!

Mike, Z34M, from Macedonia, gave me a 559 RST, as did Vasil, UX2SB, from Ukraine. Also in the log were Aco, YT1RA, from Urice, Yugoslavia, and Ivan, LZ1YP, from Nova, Bulgaria.

After signing with Ivan, I packed the Cub and my hiking sticks for the last time. We would spend tomorrow, our last day, going for a short walk on the Great Orme, packing our bags, saying our good-byes to Vic, singing songs at the farewell party and bidding our British hosts cheerio.

You can contact the author at PO Box 1462, Loveland, CO 80539; **n0bf@juno.com**.

STRAYS

INTERESTED IN A LION'S CLUB NET?

◊ Bob Conner, KD5BAJ, would like to hear from hams who are interested in starting a twice-a-week Lion's Club traffic net on 20 meters. Contact Bob at 529 Old Bridge Dr, Allen, TX 75002-4006; **kd5baj@juno.net**.

QSL MANAGER AVAILABLE

◊ After a three-year absence, Mark, WA2YMX, is available once again to be a QSL manager. Interested amateurs can contact Mark at **wa2ymx@hotmail.com**.

I WOULD LIKE TO GET IN TOUCH WITH...

◊...anyone using a Johnson Navigator transmitter. Morgan Godwin, W4WFL, 166 West 87th St, #901, New York, NY 10024-2901.

◊...anyone who served aboard the communication ship USAT *Spindle Eye* during World War II. Contact Paul Bednarik, AB7RT, 7084 N Viewscape Dr, Prescott Valley, AZ 86314.

◊...anyone who has photos of K2US, the Amateur Radio station at the 1964-65 New York World's Fair. E-mail **N2EO@erols.com**.

Next Strays

By Rick Whiting, W0TN

Safe Computing

Today's world of interconnected computer networks is amazing, useful and potentially dangerous—to the health of your computer, that is. Here's how to protect yourself and your data, no matter what your level of connectivity.

Hams have found many ingenious ways to use computers to enrich and enhance their enjoyment of our avocation. The connection is so intimate that computers are now an inseparable part of Amateur Radio, and will likely remain so for the duration.

If you connect to the Internet—and as a ham, chances are good that you do—you've probably heard about the many security mishaps that plague cyberspace on a daily basis. To prevent being a victim, you should protect your PC against malicious "attacks" that can cause problems ranging from amusing animations to catastrophic system damage. Potential attacks include computer viruses, "Trojans" and unauthorized access and control of your PC ("hackers").

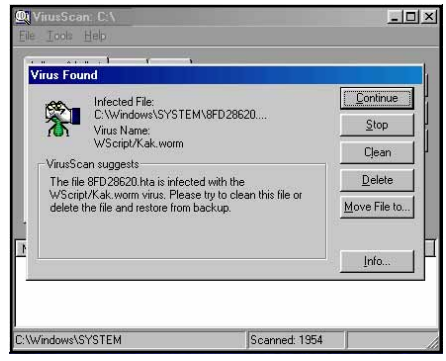
Despite the many real concerns, it's possible to have *too much* security. The right amount of protection balances the probability and potential cost of any loss with the cost of preventing it. It doesn't make sense to spend more time, energy or money than you're likely to save by being safe.

The sections that follow assume that like the vast majority of amateurs you're using a *Windows*-based PC, and describe increasing levels of security based on "exposure" or probability of attack. Much like a human virus, the greater the exposure to the "outside world," the greater the risk of "infection."

Dial-Up Connections to the Internet

If you access the Internet via a modem and a dial-up telephone connection—and don't stay connected for long periods of time—there are three basic, but important, security measures you need to take:

- Keep your antivirus software and virus definitions up-to-date.



- Keep your browser software up-to-date.
- Back up important data files.

There are several good antivirus programs to choose from. I recommend *Norton AntiVirus* based on its performance and its excellent on-line support. For casual, dial-up Internet access, loading more than just an antivirus product is probably overkill. Besides, additional applications running in the background usually invite system crashes or other unwanted behavior.

If your antivirus program is built into a multi-application suite such as *Norton SystemWorks*, install only the required antivirus application. You can install the other applications in the suite later—*if you need them.*

Avoid opening e-mail attachments unless you know what they are, who sent them and why you're opening them.

Be sure to upgrade your antivirus program and virus definitions frequently (an on-line procedure). This is vital, especially if you use e-mail or share files. Vendors generally publish updated virus definition files every week.

Browse your antivirus program provider's Web pages periodically to learn about new security threats and how to protect against them. And while you're there, sign up to receive security alerts via e-mail. This is also the place to download updated virus definition files and program updates.

Avoid opening e-mail attachments unless you know what they are, who sent them and why you're opening them. An attachment could contain a new virus not yet in your antivirus definition file. Use your antivirus program to check any disk given to you (before opening any files on it).

Netscape Navigator and *Internet Explorer* Web browsers have regular fixes for security holes and program bugs. You can download updates and security patches from the vendor's Web site. To update *Navigator*, click on **Help|Software Updates**. To update *IE,* click on **Start|Windows Update**.

Even if you don't use the Internet you need to back up your important files! And don't forget to keep your *Windows* emergency disk on hand to counter *Windows* start-up difficulties.

Increasing Your Security

Many virus coders have used the macro programming language in Microsoft *Office* software products to do their dirty work, so be *very* careful when opening any document containing "macros." You can prevent macros from running without your permission. In *Word 97*, open a document, click on **Tools|Options|General** and be sure **Macro virus protection** is checked. In Office 2000 applications, click on **Tools|Macro|Security** and set the secu-

rity level to **Medium**, if not **High**.

Additionally, turn off file and printer sharing by right clicking on "Network Neighborhood" then selecting Properties, Configuration, File and Printer Sharing. This will make it more difficult for hackers to gain access to your files or your printer.

For increased security you can disable the *Windows* scripting host (WSH). Some viruses have used WSH to accomplish their nefarious purposes. Documented security breaches in the past have shown this feature to be particularly susceptible to outside attacks.

WSH allows files (known as VBS script files) to automate and/or execute commands to your system without your intervention. These commands can do virtually anything you can do from your keyboard—including sending e-mail (with attached viruses) to everyone in your address book or damaging files on your PC. For more information point your Web browser to **www.symantec.com/avcenter/venc/data/win.script.hosting.html**. Download noscript.exe to toggle WSL on and off.

Another tip is to "un-hide" file extensions for known file types. This will help prevent someone from tricking you into opening an e-mail attachment that you think is a "safe" file type (for example: a text file that's really an executable file).

If you use an "always on" connection to the Internet (cable modems, wireless T-1, DSL, etc) you need additional security

Always-On Connections

If you use an "always on" connection to the Internet (cable modems, wireless T-1, DSL, etc) you *need* additional security beyond the steps listed above. At a minimum you'll want to properly set *Windows'* protocol layer "bindings" and add personal firewall software such as *ZoneAlarm* or *BlackICE Defender*.

What's a firewall? The term describes a range of hardware and software solutions designed to prevent unwanted packets (communications) from being received or sent between networks. Here, the term firewall refers to software designed to prevent undesired packets from being received or sent between your PC and the Internet. Firewall software can be installed in your PC, an Internet access device or both.

What are "bindings"? Bindings are communication paths between various applications and operating system components in your PC. Unnecessary bindings, if configured, are open doors for hackers to gain access to your PC. The only bindings needed to use the Internet are between the Internet protocol layer (TCP/IP) and your dial-up or cable/DSL hardware layer.

To provide adequate security with an always-on Internet connection, you need a much better understanding of firewalls and bindings than provided in this introductory article. A good place to start your education is "Broadband Internet Security Basics" at **www.cable-modem.net**. To find the article there click on "Broadband Security" under Topics. Next, read "Make Your PC Hacker-Proof" at **www.pcworld.com.** To find the article at the *PC World* Web site, enter "hacker proof" in the search box and press **Search**.

When you've completed your "homework," test your system's security with *Shields Up!* at **www.grc.com**. This is Gibson Research Corporation's home page. It will open the door to a lot of relevant information. Click on the *Shields Up!* and again on the next page, then click *Test My Shields* and *Probe My Ports* to run the tests. The test, written by Internet security and PC hardware guru Steve Gibson, works with *Netscape Navigator* or *Internet Explorer*.

Gibson's site can also fill in the details about protocol layer bindings in *Windows* and how to set them for maximum security. If you did a good job reading the information on the Gibson Research Web site, you will already know about bindings. If not, go to **grc.com/subondage.htm** and complete your homework assignment.

If you'd like a "second opinion" on your PC's security, run the Symantec (Norton) test at **www.symantec.com/security/check/** by clicking on Symantec Security Check. The site works best with *Internet Explorer* 4.01 or later, but works with *Netscape Navigator*, too.

A note regarding personal firewalls. Although *ZoneAlarm* is free, it tends to appeal more to "techies." If you prefer to be minimally involved in your firewall's operation and activity, you might want to buy *BlackIce Defender*. Of course, there are other firewall packages available, but these two are by far the most popular among home users.

Small Office or Home Network

Many small offices and a growing number of homes use local area networks (LANs) to allow file and printer sharing among connected PCs. If you have a LAN you may want to use an Internet sharing device with built-in security features to connect your home or office LAN to your always-on Internet service. Typical devices in this class combine a cable modem or DSL terminal with a router/network hub.

One example of an Internet sharing device is SMC's Barricade (Model SMC7004BR), a four-port 10/100 broadband router (see **www.smc.com** for details). Similar products are manufactured by D-Link and Linksys. Some Internet sharing devices incorporate programmable (and updateable) security features that may obviate the need to run firewall software in your PC.

Before selecting an Internet sharing device, compare the features of several models against your needs, especially if your LAN users are "gamers," or if you want to use a virtual private network (VPN).

Conclusion

The challenge here is to provide enough—but not too much—security. You must stay on the alert. There's no such thing as a completely secure PC. Miscreants (and even some "legitimate" companies) are constantly exploiting new ways to attack your computer or use it to serve their own purposes. If you understand and continue to apply the concepts described here, you can sleep soundly knowing that your PC and data are as safe as *reasonably* possible.

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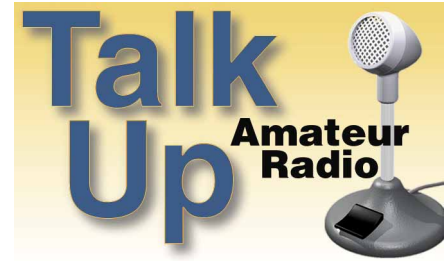


By David L. Hollyer, W4SG

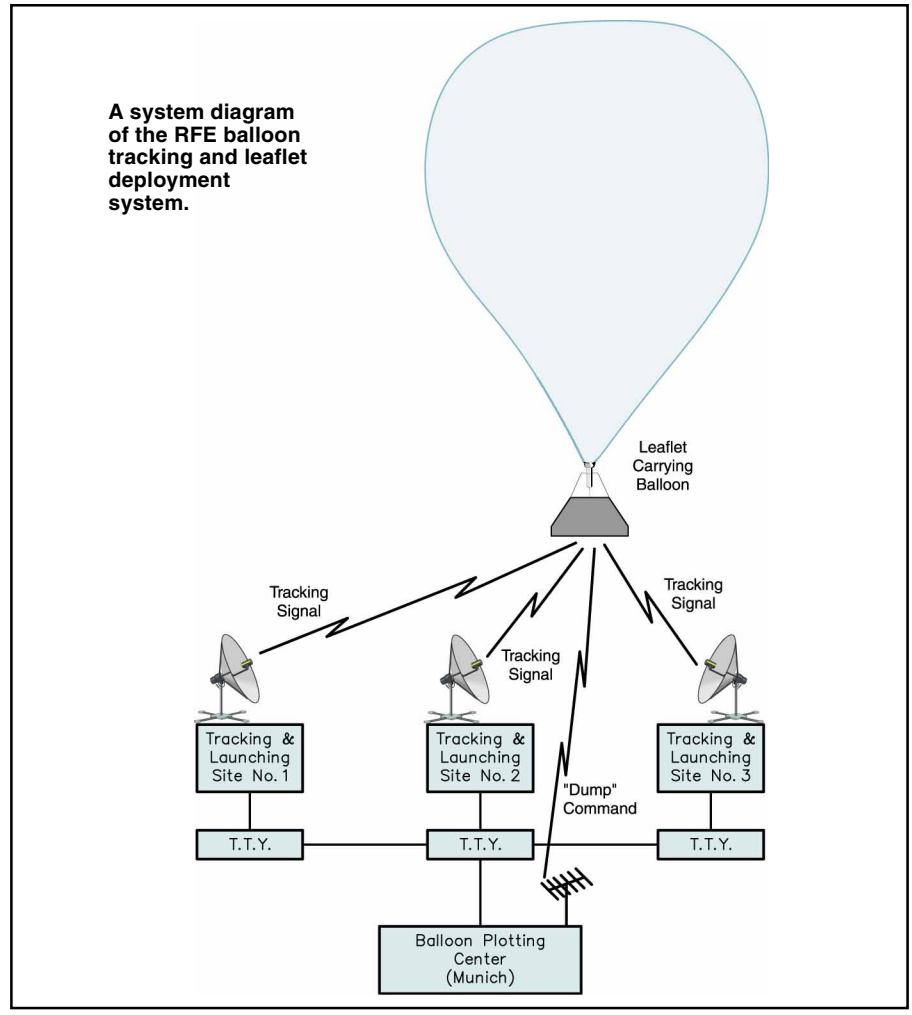
Winds Aloft:
When Radio Free Europe Flew Balloons

Although it wasn't common knowledge, balloons carried and dropped leaflets to the subjugated people living behind the Iron Curtain, and in the process became one of the Cold War's most effective weapons. The practical wisdom and technical assistance provided by Amateur Radio and the many hams involved contributed to the development and success of this unique program.

In the early 1950s the cold war was at its peak. Radio Free Europe (RFE) was transmitting shortwave broadcasts from locations in Germany and Portugal night and day, sending factual news and encouraging messages to the beleaguered and news-hungry citizens living behind the Iron Curtain in Poland, Hungary, Czechoslovakia, Rumania and Bulgaria. Familiar voices of known personalities who had defected spoke to listeners about life in the West and reported the truth about stories in the news.

But it wasn't enough. Powerful jamming stations throughout the USSR masked and obscured RFE broadcasts. Some transmissions were reaching their targets, but many were lost despite the best technical efforts of RFE engineers. Something else was needed—a method of delivering messages intact. An idea dubbed "Balloon Action" was born.

The concept was simple: Obtain some large balloons, load them with information leaflets, launch them from Germany when the winds were blowing eastward and dump the leaflets over the target countries. But translating that simple concept into a practical scheme wasn't exactly easy. How, for example, could the balloons be directed toward a desired location? How did project officials know when the leaflets had reached the target? And how could the leaflets be delivered (dumped) once they reached the desired location?



A system diagram of the RFE balloon tracking and leaflet deployment system.

Research got under way. A team at Holloman Air Force base in New Mexico was already conducting upper-air research using large balloons. And Minneapolis-based cereal manufacturer General Mills was taken under contract by the US government, as was Winzen Research.

Free Europe Press, an associated organization, was in charge of the program. Radio Free Europe was asked to provide technical assistance using RFE Engineering personnel and sites to begin a series

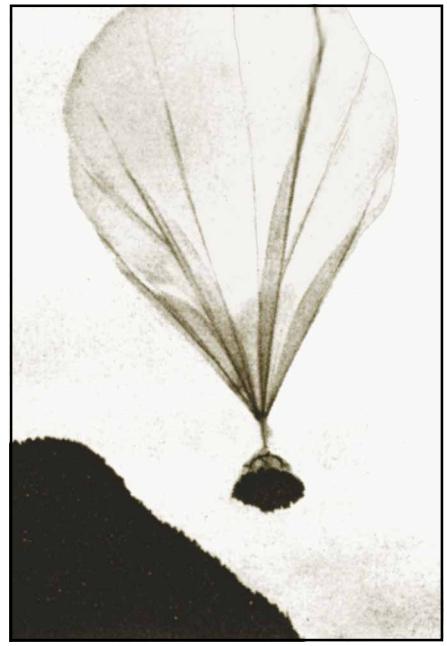
of launches. This part of the program began under the direction of the RFE Engineering Department, headed by George Graveson, K4JI (now a Silent Key), who was Director of Engineering. I was assigned as Balloon Action Technical Director. Jack Quinn, W6MZ, was RFE Director of Technical Operations. Also working on the project was Marvin Handleman, W1IKS (now a Silent Key). Our initial site was the RFE Receiving and Monitoring Station located in Schleissheim, a small village about 12 miles north of Munich on a former Luftwaffe fighter strip.

Within weeks equipment began arriving, including a World War II surplus Adcock High Frequency Direction Finder, complete with a housing and a rotatable antenna, plus crates of balloons and some surplus radiosonde equipment from the US Weather Bureau. Then came some personnel from an unmentioned US government agency. One was an engineer I'd known casually many years earlier. The other was a meteorologist, formerly associated with the Massachusetts Institute of Technology (MIT).

The Direction Finding (DF) equipment was set up and tested. A few small balloons were inflated using locally purchased hydrogen. Helium was never used because, for some unknown reason, it couldn't be exported from the US to Germany. A small battery-operated radiosonde transmitter with a single vacuum tube operated in the 7-MHz range and used a trailing wire antenna. It was packaged in a small compartment suspended from one of the balloons.

The keying device consisted of a tiny battery-operated motor that rotated a disc about three inches in diameter. The surface of the disk was imprinted with Morse code elements (dots and dashes) from A to Z in concentric circles from the inside hub to the outer diameter. In place of what would have been a pickup arm in a phonograph, the device used a stylus that moved over the surface of the disc from the inner hub to the outside diameter. The stylus was attached to an aneroid capsule so that changes in altitude caused the stylus to move laterally across the disc.

Thus, the letter A at the inside of the disc would be "played" when the device was at ground level. As altitude increased, the stylus moved across the disc, making contact with the printed Morse code characters. The inner hub represented ground level and the outer diameter (letter V) represented about 50,000 feet. As the stylus made contact with the disc it keyed the transmitter with Morse code letters that corresponded with the altitude of the balloon.



A 34-foot leaflet-carry balloon begins its voyage over the Iron Curtain.

An operator listening to the receiver in the Adcock Direction Finder would immediately know the altitude of the balloon by the Morse code letter it was transmitting and the geographical bearing of the signal. To determine a more precise location of the balloon, two or more direction finders would take bearings from different locations. Then, by triangulating the bearings, the location of the balloon could be determined.

Shortly after initial testing, three more launch sites were set up: Fronau, near Bad Reichenhall on the Austrian border; Freying, about 200 kilometers east of Munich; and Hohenhard, about 350 kilometers northeast of Munich. The test site at Schleissheim was shut down and the three new direction finding (DF) sites were activated so future launches could be accurately tracked.

To provide coordination, a Plotting Center was set up at RFE headquarters in Munich and connected to the other sites by teleprinter (TTY). It was good progress, but there was still work to be done.

The meteorologist wanted to know wind conditions at various altitudes so he could predict how the balloons would travel. At Schleissheim we were able to receive the "Winds Aloft" facsimile signals sent by the US Navy's Sixth Fleet. This provided the meteorologist with the information he wanted.

Still missing from the operation was a means of dumping leaflets when the balloons were over the desired location. The first methods were crude. One balloon-borne radiosonde transmitter was sent aloft with each group of 10 leaflet-bearing balloons. At first, the balloons were small, about a meter in diameter, which limited the number of leaflets that could be carried.

Suspended under the balloon was a small balanced basket, much like a scale, with leaflets on one side and dry ice on the other. When the dry ice melted, the scale would unbalance and dump the leaflets. Another variant, a small pillow-shaped balloon, was designed to burst at a predetermined altitude, dumping the leaflets.

The magic that the meteorologist had to perform was to calculate how far east and how high the balloons would be when the dry ice melted or, in the case of the pillow balloons, how high and how far east they were when the balloons burst. The DF radio operators would hear the change in Morse code letters as soon as the load was dumped and when the balloon eventually plummeted rapidly to the ground. On the whole it was a very imprecise system. A method of controlling the dump from the ground was needed.

Detective Work

But that wasn't the only difficulty. The DF operators began to notice that within a few minutes of launching, and after the balloons had reached jet stream altitude, sometimes as high as 45,000 feet, signals began to weaken while the balloons were still some distance west of the target countries. It was a serious problem and a very big puzzle.

In a meeting with the meteorologist I was asked why the signals weakened so soon after launch. I answered his question with one of my own: "How cold does it get at 45,000 feet?"

"Oh, about 45 degrees below zero, maybe colder," the meteorologist estimated.

"Well, you know," I answered, "we've only got a little vacuum tube transmitter with no more than 10-W output. It runs on 135 V of 'B' battery and I'm pretty sure that the voltage drops drastically at those temperatures! When it does, the power output of the transmitter falls with it and the signal almost disappears!"

Determining the temperature effects on battery power was simpler than we had thought. From the US Army Post Exchange (PX) we purchased a chest-type deep freezer and a Westinghouse electric oven. We placed the radiosonde transmitter—with its batteries—in the freezer and brought out leads to read the freezer temperature, the battery voltage and the power output of the transmitter. Then we "adjusted" the freezer's thermostat so it would operate down to about –45 ºF. We

produced a chart that plotted battery voltage versus transmitter output at various temperatures. *Voila!* We had the answer.

With an ambient temperature and with a normal plate voltage of 135 V, we measured an output of about 10 W. As the temperature dropped, so did the battery voltage and transmitter output. When we eventually reached –45 ºF, we had a plate voltage of only 7 V and an RF output that was barely readable. Our crude environmental test chamber had given us the answer. Now we needed a solution.

In another brainstorming session we placed the 135-V "B" battery in the oven and fired it up. When the temperature reached 180 ºF, tar was oozing from the battery but the output voltage was normal. Wrapping the battery in insulation, we reverted to our original test fixture in the freezer. Hours after the heated battery had been subjected to below-zero temperatures, its voltage was still close to normal and the transmitter output remained about 10 W! The problem was solved. All we needed was an insulating package for the batteries.

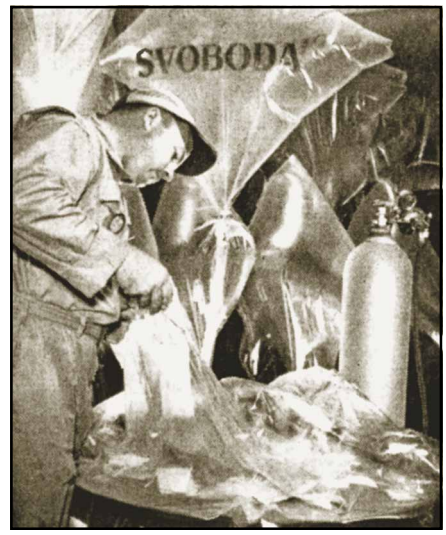
In the US we would have gone to a hardware store to buy some sheets of Styrofoam. Instead, we visited a local factory and learned that here, at least, the stuff was off limits. Moreover, the factory wasn't licensed to use "foam-in-place" chemicals to construct the insulating boxes we needed. What they did have was a system that used heat, pressure and molds. They poured beads of plastic "popcorn" into the molds and produced our insulated boxes by the hundreds.

The procedure at the launch sites was to heat the batteries in the oven until the tar was oozing. Then, using insulated gloves, the hot batteries were placed in the insulated boxes, wrapped in filamentary tape and the packages were ready to launch!

After the changes, tracking was dramatically improved. We were receiving signals from as far away as the Ural Mountains in Russia. As a matter of fact, we received a signal for three days from Yugoslavia—at ground level—indicating that the balloon had burst and dropped toward ground and was probably caught in a tree. The batteries had survived long enough to power the transmitter for three days.

Additional Innovations

Soon, additional experts arrived from General Mills and Winzen Research. They concentrated on two aspects of the program: (1) how to dump the leaflets once the balloons were over the target and (2) how to use large balloons instead of many small balloons.



Loading leaflets into small "pillow" balloons.

We decided that instead of the original crude dry ice system, it would be necessary to transmit radio signals from the Balloon Plotting Center to trigger the large balloons to release the leaflets. We knew that the triggering signal must be coded so extraneous signals couldn't trigger an errant dump. We focused on using a specific series of audio tones that would be recognized by the balloon receivers. Resonant reed relays, commonly used to decode radio command signals sent to taxis, delivery trucks (and even model airplanes!) were readily available and tuned for a range of audio frequencies.

A low-power (400 W) HF transmitter would be modulated with an audio tone generator. A coding device would send a series of three audio tones in a prearranged sequence. One of the relays would close when it recognized its unique audio tone, then relays two and three would respond. When all three relays had closed in the proper sequence, a signal would be sent to the master relay, which would actuate the leaflet dumping mechanism.

A test using a miniature radio receiver proved that the system worked like a charm. Several receivers were constructed and the team of newly arrived experts started working on a dumping mechanism.

Several designs were developed and abandoned for one reason or another. Many were truly "Rube Goldbergish" in concept. One strange model used a bicycle wheel, an alarm clock and a long threaded rod. Plastic bags, each containing a quantity of leaflets, were placed around the periphery of the wheel. Cords holding the leaflet bags were cut by a razor blade each time the wheel rotated to a new position. In this fashion, bags of leaflets could be dropped, one at a time, over a large area. A number of these devices were manufactured at the General Mills plant in Minneapolis and shipped abroad.

Another system that was used successfully for an "area drop" used a drum-type reel holding about a mile of foot-wide polyethylene tape. Rolled onto (into) the tape reel were thousands of leaflets that were written and printed by Free Europe Press. One mile of tape could be pulled off the reel by wind cones when a relay triggered a release mechanism. Balloons large enough to handle this system *and* a several-hundred-pound payload of leaflets were gigantic—one model was nearly 60 feet tall!

As the dumping system was refined, improvements in the tracking system were also made. A newer radiosonde, operating in the UHF range at 1296 MHz, was obtained. It utilized a newer "lighthouse" tube. Replacing the cumbersome Adcock Direction Finder, with its large rotatable antenna, was a compact and efficient UHF unit called an Electronic Theodolite. It used an 18-inch "dish" antenna. The system was lightweight, tripod mounted and provided good reception when the balloons reached a high altitude.

Large-Scale Operations

At this point in the program's development the monster balloons began to fly. When ground tracking indicated they were over the desired target, the Balloon Plotting Center transmitted a coded release signal and initiated a leaflet dump.

Were the drops effective? So much so that protests started to arrive from several Communist-dominated countries. They were sent to the United Nations, to the West German government and to many international agencies.

One common complaint: "They're smuggling into our countries!" This was easily discounted. The leaflets were not considered to have any monetary value.

Another: "They are a menace to air navigation!" This, too, was doubtful. The balloons were large enough to be highly visible and flew high enough to be far above normal flight paths.

And most frequently: "They're dangerous!" Why? They contained hydrogen gas. True, a balloon *might* catch fire if enough residual gas remained after the mechanism's crash landing, but that seldom happened.

To show how seriously the Communists wanted to shut down the launch sites, they made at least one attempt at sabotage. At one of the fenced launch locations on the Germany-Czechoslovakia border, a guard at the entrance gate

was approached by a workman dressed in coveralls and carrying a tool kit. He explained to the guard that he was from the firm that supplied the hydrogen and was coming to inspect the hundreds of tanks stored on-site. He said that some of them were suspected of leaking and he was checking them to prevent a possible catastrophic fire.

The guard held him outside the gate and appeared to make a phone call from the guardhouse to his boss to get permission for the workman to enter. Actually, he called the local office of the Grenz Politzei, the West German Border Police. Officers raced over in a jeep and searched the workman. He did, indeed, have some credentials, but he also carried in his tool case, in addition to the usual tools, several thermite grenades and timers. His capture prevented what could have been a major setback in the balloon program. Rumors had it that he was sent from a specially trained Czech Army unit.

Soon, letters drifted in to RFE with reports that aircraft from some of the target countries were attempting to shoot down the balloons. The writers reported that, although the planes didn't knock many down, they simply helped to spread the leaflets during each "successful" interception.

After the shoot-down attempts started, leaflets destined for Hungary were loaded into the balloons along with hundreds of pounds of imitation "forints," small Hungarian coins. The synthetic currency was made of shiny aluminum foil that was easily visible as it shimmered in the grass and on the ground. On the coin a message was printed in the Hungarian language. Other messages were printed on adhesive-backed paper. These often ended up pasted on buildings and public meeting places.

The leaflet program, carefully coordinated with RFE radio broadcasts, was having exactly the desired effect. The leaflet drops were becoming so accurate that the radio broadcasts alerted listeners just before the arrival of the latest barrage of leaflets, advising listeners to "look skyward! More leaflets are coming!"

Self Sabotage

The balloon program was ultimately a victim of its own success. Although protests filed with many government agencies had been fruitless, the Czech government invented a tactic that worked. It reported that a passenger plane had crashed and burned in the mountains. Headlines in Communist-controlled newspapers reported that the remains of a large leaflet-carrying balloon had been found in the wreckage and that it was assumed that the plane had run into the balloon and crashed.

There was suspicion that some quick thinking Czech propagandist had rushed to the crash site with the remains of a previously crashed balloon and placed it among the debris of the airliner. The foreign press was invited to photograph the "evidence." Legitimate or not, the story was difficult to refute. And it worked. The "evidence" eventually convinced government officials to pressure West Germany to forbid further balloon launches from its soil. This incident spelled the end of the "Balloon Action" program.

Was it successful? Well, from 1954 to 1956, nearly 600,000 balloons carrying more than 300,000,000 pieces of printed material were sent aloft and dumped over Czechoslovakia, Hungary and Poland to be read by news hungry citizens.

Ingenious, effective and "unjammable," it had been able for many months to soar above the "Iron Curtain" to deliver its messages of hope to the citizens of several Communist-dominated countries.

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NEW BOOKS

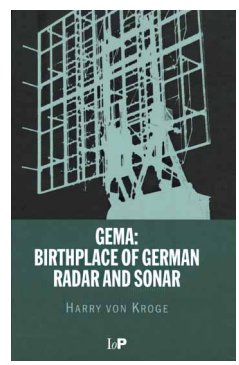
GEMA: BIRTHPLACE OF GERMAN RADAR AND SONAR

By Harry von Kroge

Published by Institute of Physics Publishing, Bristol, United Kingdom; **bookmark.iop.org/**. *First edition, hardcover, 250 pages, 6 × 9 inches with black and white illustrations. $73 plus shipping and handling. Available directly from Institute of Physics Publishing (on-line ordering),* **amazon.com**, *and other technical book retailers.*

Reviewed by Steve Ford, WB8IMY
QST *Managing Editor*

The development of radar is a fascinating story by itself, especially as it concerns its use in warfare. What makes *GEMA: Birthplace of German Radar and Sonar* particularly interesting is fact that the book gives us an intimate look at how this technology was researched on the "other side." Harry von Kroge chronicles the progress of radar (and sonar) in Germany, beginning with Christian Hulysmeyer's "Telemobiloskop" in 1904. Soon afterward, two engineers who were drawn to the science of radio as Amateur Radio operators—P. G. Erbsloh and H.K. von Willisen—stepped forward to carry the idea of radio and acoustic surveillance to viable working projects. In 1934 they created their own company known as GEMA (Gesellschaft fur Elektroakustische und Mechanische Apparate).



GEMA became one of the most important technological centers of the German war effort. It was the birthplace of the famous (or infamous, depending on which side you were on) Freya air warning and Seetakt ocean-going radars. Much of the history of GEMA was scattered and obscured after World War II, but Kroge does an outstanding job of gathering disparate bits of information to create the whole story.

GEMA: Birthplace of German Radar and Sonar was originally written in German and translated to English by Louis Brown. Brown's translation was obviously painstaking; you can tell that he went to great lengths to preserve not only the meaning, but also the subtleties of Kroge's work. With much of the history set in World War II, the book is not without its harrowing moments—such as when the GEMA teams evacuated their factories just ahead of the approaching Red Army. (The factory buildings were being shelled as they worked.)

This book is primarily intended for science and technology historians. In that sense, it is not a page-turning account. Readers hoping for a Tom Clancy-esque fictionalized tech novel will be disappointed. It's also assumed that readers are technically educated, so some may find *GEMA: Birthplace of German Radar and Sonar* to be a challenging read. Despite this, the book provides a rare glimpse into a window of history that few of us will ever know. If you want to have a well rounded, complete perspective on the birth and development of radar, *GEMA: Birthplace of German Radar and Sonar* is essential.

Next New Books

By Wayne Mills, N7NG

DXing in the 21st Century—The DXCC Challenge

The lure of DXing traces its roots to the earliest days of radio. From the beginning, some amateurs focused on "pushing the envelope" to increase the distance their signals could span. By the mid-1920s, they were making contacts around the world and it was impossible to work any farther, so attention turned to working as many different places as possible. Recognition of this fact resulted in the IARU Worked All Continents (WAC) award in 1926. Hams wanted a method for gauging their accomplishments beyond continents, so counting the number of countries worked followed naturally. The origins of modern DXing are found in the landmark October 1935 *QST* article, "How to Count Countries Worked," by Clinton B. DeSoto, W1CBD.

DXCC Begins

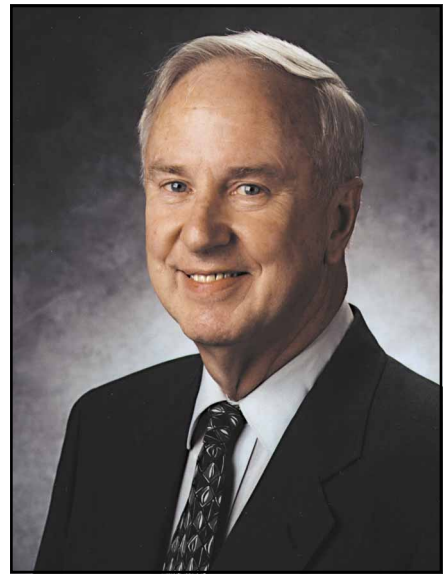
The DX Century Club program and initial rules were announced in *QST* for September 1937, and early DXers responded immediately. The first DXCC members, with just over 100 different countries, were listed in the November 1937 issue. A year later, DXCC number 64 was issued to R.L. Varney, G5RV, and the program steadily grew in popularity as more amateurs joined the program and the top DXers added to their country totals. But it was not until the early '60s that anyone had confirmed contact with all of the entities on the DXCC list.

Even in the late '50s, there was a real competition involving the top DXers. Who would be on top of the Honor Roll when *QST* came out next month? The Honor Roll was defined as the top 10 number of entities actually worked by members, rather than the top 10 number of total entities on the list. At that time, the DXer on the top of the Honor Roll was the operator who had worked more entities than any other DXer, and nobody had worked them all.

The top of the Honor Roll was a moving target. The number of DXCC entities needed to make the Honor Roll increased steadily as more entities were activated and worked, and there was a real challenge for the top spot. When my *QST* came in the mail each month, I always went directly to the DXCC Standings to see if Don Wallace, W6AM, had overtaken Charlie Mellen, W1FH.

Crowding at the Top

As time wore on, more and more DXers worked all possible DXCC entities and achieved the top of the list. But reaching the top of the DXCC List was different from the ongoing Honor Roll competition of the early days because once you'd worked them all, there was no place to go. There were efforts to add more entities to the DXCC List, but it couldn't keep up with the "demand." Eventually, many top DXers were crowded at the top, ending the continuing competition.



Bob Eshleman, W4DR, the winner of the 2000 Clinton B. DeSoto Challenge Cup.

The Clinton DeSoto Challenge Cup.

Several years ago, ARRL formed the DXCC 2000 Committee to study the DXCC program and make recommendations for its future. Among the Committee's recommendations (adopted by the ARRL Board in January 1998) was an award program that would reintroduce a competitive atmosphere for the more serious DXers and be difficult to top. First, the Committee added single-band DXCC awards for each band that did not already have one. Further, they created an award called the *DXCC Challenge* to recognize the total number of DXCC entities worked on each amateur band between 1.8 and 54 MHz (except 30 meters). The DXCC Challenge is available to any DXCC member who has confirmed a minimum of 1000 entities on any combination of the various eligible bands. Finally, the DXer who was on the top of the "Challenge List" each year — the one who had the highest total of band-entities — would be awarded the Clinton B. DeSoto Challenge Cup, named in honor of W1CBD, who showed us how to count countries more than 65 years ago.

The DXCC Challenge

The DXCC Challenge is similar to the popular Five Band DXCC award and is, in fact, a natural expansion of that award. Today, nearly 1000 DXCC members already qualify for the Challenge award with at least 1000 band-entities. Effective at the beginning of 2001, the DXCC credit slip that is returned after we process any DXCC submission contains a complete record of a member's DXCC standings. When your DXCC "Chal" total reaches 1000, you will receive a

congratulatory letter, and a plaque is available for anyone who reaches that magic number. The DXCC Challenge is an ongoing award, and additional endorsement medallions are available in increments of 500 credits.

The cutoff date for the Clinton B. DeSoto Challenge Cup is September 30 each year. The winner of the 2000 DeSoto Cup was determined by submissions made on or before September 30, 2000, based on the totals from 160, 80, 40, 20, 10 and 6 meters. (The single-band awards for 17 and 15 meters were phased in during 2000 and 2001, and contacts on these bands will be included in the 2001 DeSoto Cup competition. Contacts on 12 meters will count for the following year.) When all of the contacts had been tallied, the winner of the 2000 Clinton B. DeSoto Challenge Cup was Bob Eshleman, W4DR, with 1721 entities. The cup will be presented at the Southwestern Ohio DX Association dinner in Dayton in May 2001.

Competition for the 2001 DeSoto Challenge Cup will be fierce with several other top DXers nipping at W4DR's heels and the addition of 17 and 15 meters to the mix. Like the Top of the Honor Roll competition in the '50s, it will be interesting to see who is at the top of the Challenge List next year. QST

NEW BOOKS

COMMUNICATIONS RECEIVERS—DSP, SOFTWARE RADIOS AND DESIGN

By Ulrich Rohde and Jerry Whitaker

Published by McGraw-Hill as part of their Telecommunications series; available through most bookstores and on-line. Third edition, 2001, 712 pages, hardcover 7 5/8 × 9 1/2 inches, B&W illustrations. ISBN 0-07-136121-9. ARRL Order No. CR3E, $74.95 plus shipping & handling. Order toll-free 1-888-277-5289, or online at **www.arrl.org/shop**.

Reviewed by Paul Danzer, N1II
ARRL Technical Advisor

◊ This is the third edition of this text published by McGraw-Hill, and when this major publisher prints a third edition you know a very large number of these books have been sold. As part of their telecommunications series, *Communications Receivers—DSP, Software Radios and Design* can be considered both a college textbook and a reference book.

It may come as surprise that even with over 700 pages, you probably cannot design a complete receiver based only on the material in this book. What the book does do is provide the understanding and background so you can go to one of the many references given and use the material there to do a modern design.

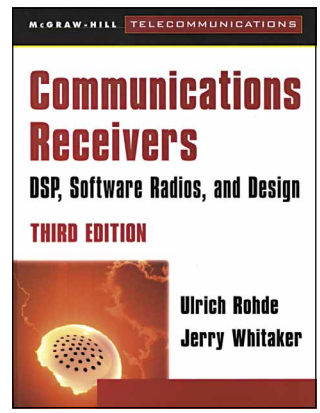
A generous background in math, including calculus, is required to understand many parts of the book. Whether you like it or not, modern receiver design requires college-level math to use and understand the equations.

Ulrich Rohde's name has appeared in both professional and Amateur Radio publications (including *QST* and *QEX*) for many years. He holds several advanced degrees including a Ph D. His family is the Rohde in the German company Rohde & Schwartz, known for their advanced communications designs. In addition, he has been a professor at several US colleges and universities. He is also KA2WEU and DJ2LR.

Jerry Whitaker is called an "educator" in the publisher's biography. He is the award-winning editor and author of over a dozen books on communications and electronics, so perhaps educator is a good way to describe him.

Both authors have a record of innovation and technical excellence, and it is reflected in *Communications Receivers—DSP, Software Radios and Design*. So, with this parentage, we have just two questions: (1) What's in the book? and (2) Should I buy it?

There is a lot to find in *Communications Receivers—DSP, Software Radios and Design.* There is a little bit of history that probably allows newer engineers to understand that good results can be obtained with relatively few parts and an unsophisticated design. The text then branches out into just what you might expect—advanced waveforms, modulation schemes, digital radio design, DSP and the whole group of new design technologies that let us take advantage of integrated circuit parts.



The modulation review in the first chapter runs through what are today's common and not-so-common modulation schemes. Integral equations, block dia-grams, spectra drawings, waveform draw-ings and Argand plots are used to illustrate the advantages and limits to both digital and analog modulation techniques. The results of analog-to-digital conversions and various digital filters are given with many illustrative drawings. Therefore, when you get a little further into the chapter and see a schematic of an early vacuum-tube receiver, using 215As and a UX-120, the use of 1930s symbols catches your attention!

The Radio Receiver Characteristics chapter shows impulse responses and channel characteristics by using a set of terrain drawings. The result of bounces, reflections and vectorial addition of multiple paths are both illustrated and discussed. The chapter serves to define the basic receiver requirements for controls, performance, BER and reception quality.

Chapter 3 lays out the calculations and requirements for noise figure. Unfortunately, it is not always apparent what each symbol means—but if you really want to go into noise, spurious responses and various types of filtering, this is certainly a chapter to read. The list of references at the end of this and most chapters is extensive. Those at the end of this chapter included both Amateur Radio publications and professional engineering publications, with dates from 1935 to the present.

Antennas are dealt with in a way somewhat different from most antenna texts. Plots include both calculated and measured data, and there is stress on non-resonant very short whips and matching these non-optimal antennas. There is an interesting drawing of the field strength surrounding a cell phone, but the text is a bit sparse here and it doesn't state if the simulation shown assumes a hand was holding the telephone or if the phone was near an equally simulated head.

The last chapter of the book is titled Receiver Design Trends. If anyone has the right to try a crystal ball, these two authors have that right. I found it interesting that they seemed to concentrate on spectrum occupancy and bandwidth rather than with questions on components or design techniques. Perhaps there is a message there.

So, should you buy *Communications Receivers—DSP, Software Radios and Design*? If you are a professional in the field, you may already own an earlier edition and probably want to compare this edition. Many hams, however, belong to a club that maintains a library. There are often a number of editions of *The ARRL Handbook for Radio Amateurs, The ARRL Antenna Book* and *HF Radio Systems and Circuits* by Sabin and Schoenike (reviewed here in May 1999—you didn't miss that goody, did you?). Due to its specialization and complexity, most hams will probably opt to have an accessible copy in their public library, club library or the library of a local college. True receiver design buffs will, however, have to make their own decisions! QST

Previous New Books

By Steve Ford, WB8IMY

Balloon Lost!

They launched the ITA-4 balloon and waved goodbye, assuming it would never return. Little did they know…

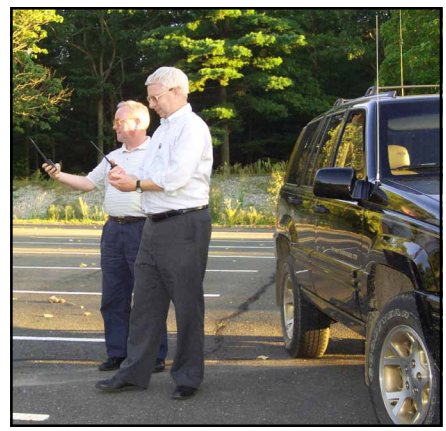
The recipe for an Amateur Radio balloon flight is relatively simple when you boil it down to its component parts.

1. Design and build an electronic payload. Pack it with insulation against the bone-shattering cold it is about to experience.
2. Buy a weather balloon.
3. Inflate the balloon with helium. Burst the balloon accidentally. Buy another.
4. Notify the FAA and release the balloon.
5. Track telemetry and wait patiently as the balloon soars to more than 100,000 feet and explodes.
6. Bite fingernails and pray that the payload parachute returns your precious cargo to a gentle landing on terra firma.
7. Pray again as the tracking team searches for the payload.

The reason we don't often enjoy the spectacles of high-altitude balloon flights in New England has a lot to do with Step 7. Unlike the fortunate folks who live in the Plains states, our balloons have an annoying tendency to release their payloads over the Atlantic Ocean. If providence takes a hand and allows the payload to touch down on land, it is most likely to find itself entangled in the branches of one of our abundant trees—and atop a ridge or mountain for additional torment. Those brave souls who occasionally launch ham balloons over New England usually develop a fatalistic attitude toward the enterprise. From the moment they send their balloons skyward, they know the chances of recovery are exceedingly slim.

This was the mindset of Pierre Thompson, KA2QPG, when he launched the ITA-4 balloon from Rifton, New York, on September 17, 2000. Pierre takes the story from here…

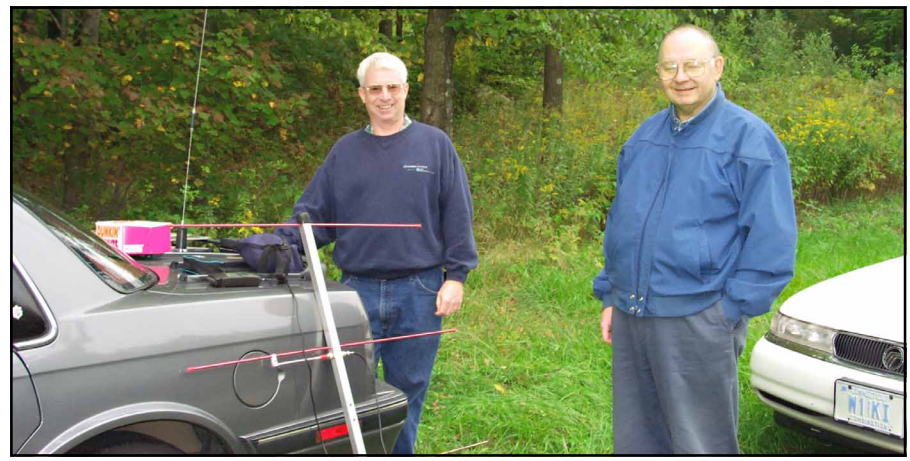
"The balloon was launched a few minutes after noon from a field near my house. It was part of an educational science project for Woodcrest School. A few friends (including two of my brothers and John, KB2PDX) and I had sent up three other high-altitude balloons carrying disposable ham radio beacons during the year. Typically, they reported back the air temperature and pressure, as well as the temperature of the on-board electronics. This being our fourth launch 'into thin air,' we designated the flight 'ITA-4.'



Ed Mathews, KC1JV (left), and Paul Gibson, N1TUP (right), in the parking lot of the Villa Louisa restaurant. At this point—late Friday afternoon the day before recovery—they had just finished DFing as far as they could by listening to the 10-meter beacon. It was time to use the H-Ts and track the beacon on its 2-meter harmonic.

"The payload contained a 9-V lithium battery, a 5-V low-dropout voltage regulator, a PIC12C671 microcontroller, two DS1721S temperature sensors and a crystal oscillator module from a computer board. The oscillator output was a trapezoidal wave on 28.236 MHz, about 4.5-V peak to peak. Above and below the box ran a half-wave dipole cut for the frequency.

"The weather Sunday morning was mostly clear, but there was a breeze from the southwest which was supposed to increase to 15 to 20 mph by late afternoon. Therefore, we inflated the balloon in a nearby building with a double door to the outside. We found that the ceiling was too low for a vertical inflation, so we held the balloon on its side while filling it. This was not a good idea; the lift of the helium caused a big bulge on the topside of the balloon, and we were afraid it would get too thin and rupture on that side. So, we stopped inflating it before we had the desired 4 pounds of lift. We clamped the neck of the balloon and tied on all the payload parts, along with two



Paul, N1TUP (left) and Wayne, W1KI, met early Saturday morning to begin the final trek to the target.

"I bet it's over there . . . somewhere!" Bill Mc Court, N1SSM (left), and Paul Lux, K1PL (right), pause to rest by a mill pond.

orange ribbons for visibility.

"Just prior to launch time, I stepped outside and released a 12-inch party balloon for a wind check. We wanted to make sure that the balloon would not hit a building or a tree on takeoff. The test balloon flew clear, so we performed the necessary FAA notification, got out the big balloon and let her go.

"The predicted balloon track based on NOAA wind reports at 1200Z took it a bit south of east, ending up near Waterbury, Connecticut—or so we thought. Despite the low likelihood of recovery, I jumped in a car with my brother Gus and a lot of radio equipment and we started off on the chase. We drove around and beyond Waterbury for about 15 miles without hearing a peep on the radio, so we reasoned that the payload had either been damaged on impact, landed in water or was in a valley somewhere far off the road. Such is life in the ham balloon world. We headed home and arrived just in time for supper."

…and that is usually the end of the tale.

It's Alive!

I didn't know that a balloon launch was in the offing until I received an e-mail message from Hank Riley, N1LTV. Hank is the brain behind HABLIC—the High Altitude Balloon Launch Information Center on the Web at **www.geocities.com/CapeCanaveral/3161/hablic.htm**. He thought there was a pretty good chance that the ITA-4 balloon would travel over my home in central Connecticut, and that this would be a great opportunity for me to monitor the telemetry.

The lost ITA-4 balloon may not be so lost after all. But how long would it continue to transmit? Could anyone find it before the batteries were exhausted?

At 12:05 PM, Wayne Irwin looked up and saw something that clearly didn't belong in a tree.

Hank was right. I was receiving the CW telemetry on 10 meters within 20 minutes after liftoff. The signal was strong and getting stronger. By the time the balloon reached its maximum altitude, I was seeing an S9 indication on my transceiver.

Suddenly, the signal strength began to fluctuate rapidly from S0 to S9. My guess was that the balloon had finally popped and that the transmitter was tumbling to Earth. The signal stabilized as the payload fell, but when it neared the ground it became increasingly weak. Within minutes, the beacon vanished into the noise. I noted the "time of death" and passed it along to Hank.

At ARRL Headquarters a couple of days later, I received another message from Hank. He said that the balloon payload may have landed somewhere nearby and, according to Pierre, *it might still be transmitting*. I was skeptical, but I asked W1AW station manager Joe Carcia, NJ1Q, if he could spin the 10-meter antenna array and give a quick listen.

My office telephone rang about 5 minutes later. "I hear it!" Joe said excitedly. He was receiving a moderately strong signal from the payload along a southeast heading. Joe held the phone handset up to the radio and there was no denying what I heard—it was the same beacon I had given up for dead just days before.

The e-mails started flying back and forth between Hank, Pierre and me. The lost ITA-4 balloon may not be so lost after all. But how long would it continue to transmit? Could anyone find it before the batteries were exhausted?

QST Product Review Editor Joe Bottiglieri, AA1GW, started contacting all the hams in the area who could possibly help. Soon we were receiving e-mail reports of headings from other stations. Joe dragged out a map and we attempted to plot a possible location.

A Drive in the Rain

Our best guess was that the payload had touched down somewhere along Route 9 near Essex, Connecticut. I gallantly volunteered to track it down.

I fidgeted through the remainder of the workday like a racehorse at the starting gate. In my naive optimism I assumed that the payload would simply be waiting on the side of the highway, perhaps planted on a convenient picnic table. All I had to do was jump in my car and grab the prize. It would be about as complicated as a trip to the grocery.

To paraphrase the age-old question with a touch of existentialist angst, why did the ham cross the road? To conduct a futile transmitter hunt…alone…in the rain. With Joe Bottiglieri's Grundig YB-

400 portable receiver, I drove up and down Route 9 for more than an hour—and heard nothing but roaring static and the slapping of my windshield wipers. As I gazed at the cloud-shrouded ridge tops, I imagined that our quarry was probably up there somewhere, mocking our lame efforts to find it, and running out of battery power by the minute.

The Futility Continues

The following days brought more signal reports as word spread about the mysterious payload. The Headquarters "Joes" (Bottiglieri and Carcia) plotted a new position. According to the revised coordinates, my journey had taken me well south of the landing zone. Brennan Price, N4QX, our Field and Regulatory Correspondent, decided to give it a try. He spent an evening driving in and around Glastonbury, a town southeast of Newington and on the opposite side of the Connecticut River. He, too, was treated to a symphony of static that nearly rendered him insane.

Things were about to take a turn in a positive direction (more or less). Joe Bottiglieri embarked on a cruise along a different route in the Glastonbury area—*and heard the signal!* He could barely contain his excitement when he called me on the repeater. I could hear the beacon's CW in the background. "I'm close. I know I'm close!"

Yes. Too close. The beacon signal seemed to be coming from everywhere at once and the S meter wasn't even flickering. Joe couldn't get a bearing.

Homing In with the Home Boys

Thursday morning, September 21, brought more reports. Ken Hoover, KE1LR, was hearing a steady signal along a heading that also seemed to point to the Glastonbury area. Similar reports flowed in from W1KKF, N1JEO, K1PL, W1AGP, K1BIY and many others. We relayed the telemetry data back to Pierre and he deduced that the payload probably had enough juice to continue transmitting until Saturday, September 23.

That evening Paul Lux, K1PL, and Peter Colapinto, N1XTI, spent four long hours tracking the signal. Tim Mik, WY1U and Jim Post, K1NQJ were hunting separately at the same time. Between the two teams, they determined that the payload had to be somewhere between the town of Glastonbury and the Connecticut River. That "somewhere" covered a lot of heavily wooded real estate and darkness was falling fast. A closer determination would have to wait for the following day.

Joe Bottiglieri went at it again Friday afternoon, this time joined by veteran foxhunter Paul Gibson, N1TUP. After analyzing the situation, they decided to drive to an as-yet-unexplored location and, to their surprise, they finally saw an S meter reading. Ed Matthews, KC1JV, joined them at that point with another HF receiver.

Nightfall brought their chase to an end, but they knew that the target was tantalizingly close. If only the batteries could last one more day.

When the S meters inched toward S9, Paul suggested that it might be possible to hear the fifth harmonic of the beacon on 141.180 MHz using the expanded receive coverage on his H-T. And there it was—loud and clear! The payload *had* to be within a mile, maybe less.

As the sun dipped below the horizon, Paul and Ed were stomping through the underbrush, trying to pinpoint the position with their H-Ts. Nightfall brought their chase to an end, but they knew that the target was tantalizingly close. If only the batteries could last one more day. According to Joe Carcia back at W1AW, however, the CW was becoming unstable and the telemetry was indicating a falling bus voltage. Time was running out with the daylight.

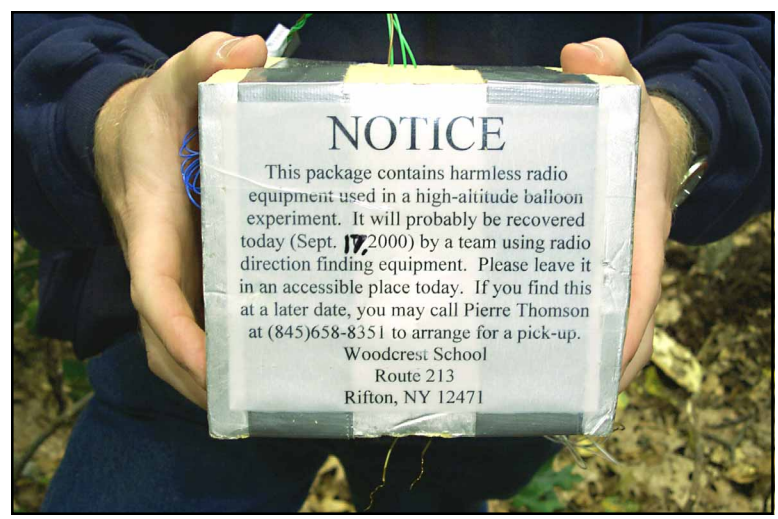
Saturday

Paul was back on the scene at 9AM Saturday morning, September 23. This time he brought his 2-meter direction-finding gear. Joe Bottiglieri met him at the site and they were soon joined by another Headquarters denizen, Wayne Irwin, W1KI.

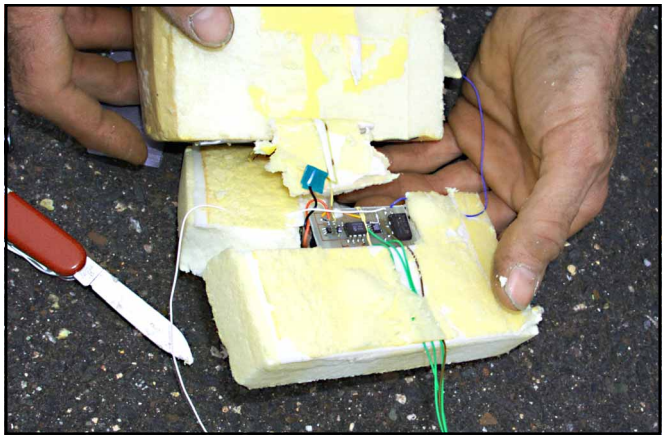
Paul had already secured permission from the landowner to enter the area. They hiked in from the nearest access road, stumbling through deadfalls and bushwhacking their way over a couple of small ridges. Paul was in his element; he had the "scent" of his prey like a bloodhound in full cry.

They coordinated their search with 2-meter FM, and that brought more help into the area. K1PL showed up, as did Bill

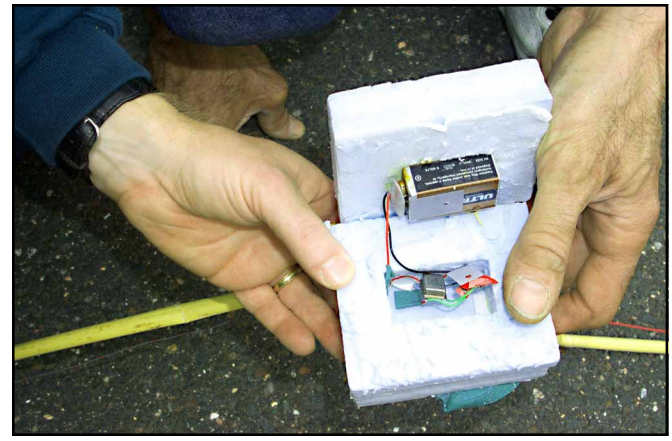
Wayne, W1KI and Paul, N1TUP, hold the prize.



Paul, N1TUP, shows the hopeful message taped to the side of the beacon package by the ITA launch team.



The ITA-4 main beacon package.



The ITA-4's backup beacon (it failed in flight).

The exhausted search team hikes back to their vehicles. Left to right, Paul, K1PL, Paul, N1TUP, Wayne, W1KI, and Bill, N1SSM (note the chainsaw in Bill's left hand).

The little boxes were marvels to behold—especially when you considered the fact that they survived a journey to the upper atmosphere, followed by six days dangling from a tree in a Connecticut forest.

McCourt, N1SSM. (Bill didn't know it yet, but he had a critical role to play in the recovery!)

At noon, the team found themselves atop a densely forested ridge. The directional antennas now indicated a path that was tilting *upward*. At exactly 12:05 PM time, Wayne Irwin glanced into the leafy canopy and saw something that didn't look like it belonged in a tree. "There it is!" he called out.

And there it was indeed—a tangle of wire, streamers and boxes about 70 feet above the ground in the branches of a long-deceased oak. After a brief celebration, a sobering reality descended on the group. How would they get the payload down?

N1SSM proposed a solution: If you can't bring the recovery team to the tree, you can bring the tree to the recovery team. He drove back to his house and returned with a chainsaw (and the landowner's permission for a little impromptu "logging").

Minutes later the tree came crashing down, along with the payload. As they gingerly pulled the modules from the branches, the beacon signal warbled like a fluttering pulse, then disappeared.

The Good News

My telephone rang Saturday afternoon. It was Paul, N1TUP, with news about the recovery. From the tone of his voice I could tell that this was all second nature to him, but I was shocked as he rattled off the details. I didn't really believe that anyone would find the package before the batteries expired—much less rescue it from a tree with a chainsaw! It was a classic example of what a bunch of high-spirited hams can do when they put their heads together.

Pierre, for his part, was flabbergasted. "I launch ITA balloons with the general expectation of not seeing them again. This is fantastic!"

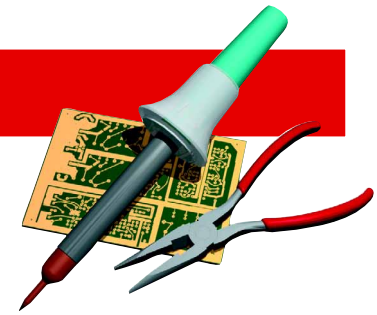
When I returned to the office Monday morning, I was greeted with the sight of the ITA package draped across a table. It reminded me of the washed-up remains of some nameless sea creature. The transmitter and control modules were small and obviously constructed with cost and weight savings in mind. If you don't expect a recovery, it makes sense to design your payload to be as expendable as possible. The little boxes were marvels to behold—especially when you considered the fact that they survived a journey to the upper atmosphere, followed by six days dangling from a tree in a Connecticut forest.

Hours later we packaged everything and sent it back to a grateful Pierre by UPS. "You know, we could do something like this," Joe Bottiglieri opined. "But we could add a GPS receiver and some other goodies."

"And how would you retrieve this expensive little package from the top of the next tree—or from the ocean?"

"We're hams," he replied with a shrug. "We'll improvise!"

All photos by Joe Bottiglieri, AA1GW.



The Doctor is IN

Q I'm just getting started with the HF digital modes, but I've run into trouble already. The "help" file in one of the software packages I recently downloaded from a source in Europe suggested an operating frequency on 160 meters between 1.838 and 1.840 MHz. I tried this and quickly discovered—the hard way—that I was in the middle of the 160-meter CW DX window. Was the software programmer mistaken in his choice of suggested frequencies?

A For the IARU Region in which he lives, I'm sure his suggestions make perfect sense. For amateurs living in Region 2 (North and South America), it will cause no end of headaches. See the ITU/IARU map in Figure 1.

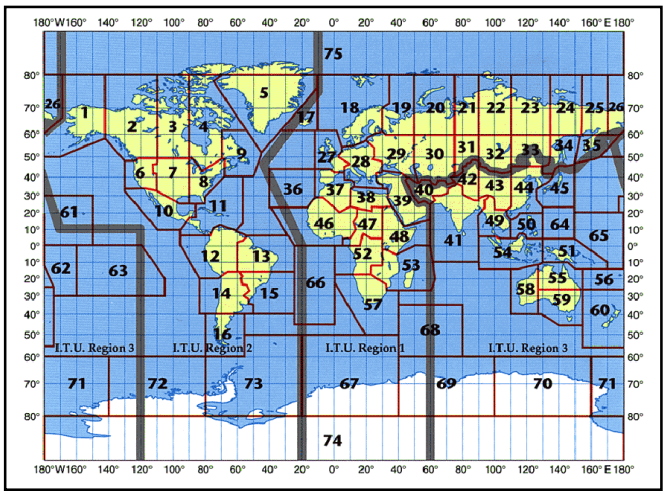


Figure 1—ITU zone/IARU region map. The IARU regions are bordered in black.

You'll find a comprehensive chart of IARU Region bandplans on the Web at **www.iaru-r2.org/p11e.htm**. The chart is too large to publish here, but let's take a look at just the 160-meter portion.

Region 1	*Region 2*	*Region 3*
1810-1838 CW	1800-1830 CW, digital	1800-1830 CW
1838-1840 digital	1830-1840 CW (DX window)	1830-1834 digital, CW
1840-1842 digital	1840-1850 phone, CW	1834-1840 CW
1842-2000 phone, CW	1850-2000 phone, CW	1840-2000 phone, CW

As you can see, on 160 meters in Region 1 the recommended digital segment is 1838-1840, so 1838 is okay in that part of the world. For hams in Region 2, however, 1830-1840 is for intercontinental operating *only*. Routine domestic operation is 1800-1830, so Region 2 digital operators should be lower in the band. It pays to remember that our world is host to a diversity of bandplans; what works in one location may not be appropriate in another. When in doubt, double check.

Q Paul, W5PDA, asks "I have an HTX-202 hand-held transceiver. I would like to rebuild the battery pack, but I'm not sure how to go about doing it. Can you give me some advice?"

A Speaking as one who has rebuilt several battery packs (mostly for laptops), I have to caution against attempting it unless you have no other option. (Keep in mind that replacement packs are available from several aftermarket manufacturers. See the ads in this issue of *QST*.) If you choose to go ahead, proceed with caution.

The pack was assembled in such a way as to prevent disassembly. In order to disassemble it, you have to break it—there's just no way around this. However, if you are very careful, you can break it in such a way that reassembling the pack is still possible, and with a reasonable appearance to boot. Start by studying the pack carefully. Try to figure out what holds it together. Come up with an idea of how to take it apart, then try to come up with reasons why that won't work very well. When you have an idea with the least "won't work" reasons, that's the one you should use.

Once you have the case apart, the rest is fairly easy. You will find multiple NiCd cells connected together with thin metal strips, usually spot-welded to the cells. Your next task is to find cells of the same size (typically nonstandard, but usually obtainable—try Digi-Key for one source). There is a caveat here: the original cells were probably matched according to their charge and discharge characteristics. If you buy unmatched cells, you won't get as much use from a rebuilt pack because you'll have the "weakest link in the chain" effect.

Once you have the replacement cells in hand, you have to connect them together in some fashion. You can do this with wire and solder, or you can use the original strips if you can yank them off the old packs without cutting yourself (been there...).

To solder the wire or strips to the new batteries is a difficult task because solder doesn't like to stick to stainless steel or shiny aluminum (which is what most new batteries use as contact plates). First, warm up your soldering iron to its maximum temperature (if you have a 300-W iron, use it, although 60 W will do). Sandpaper or file the contacts on the new batteries to rough them up a bit so that the solder has a place to stick. Take your iron and heat the contact plate up as quickly as possible—a 3-second or longer "dwell" time will probably damage the battery, so keep it shorter than that. Apply solder to the contact to make sure it sticks. Once you get the solder to stick to the contact, add your wire/metal strip and "reflow" the solder.

Of course, when you do this, you also have to make sure that: (1) the new cells go together with the exact alignment of the old cells and (2) that the solder you added doesn't cause the resulting pack to be too big to fit back in the old case.

Assuming you are able to connect all of the cells in a way that allows them to fit in the battery pack case, you'll have to find a way to get the pack back together (glue, small screws, etc).

If this sounds like a lot of work, that's because it is, but it is the cheapest way to get close to your original pack capacity.

There is a much cheaper and easier alternative, but the price

is in time per charge. Buy a battery case for the rig (made for alkalines) and just put NiCds in it. The capacity (and possibly the voltage) will be less than your original pack, but it is definitely a cheap and sweat-free alternative.

Q I operate slow-scan TV (SSTV) using sound card software. Last week I upgraded my PC to the *Windows ME* operating system and now my SSTV software is acting up. According to what I see on the display, I am grossly overdriving the sound card input. Reducing the LINE INPUT volume control on the sound card mixer helps, but I have to practically take the level to zero (and it is very touchy). Is this a problem with *Windows ME?*

A In an indirect way, yes. If you did a full installation of *Windows ME* (not just an upgrade), chances are it loaded a Microsoft sound card driver automatically. Depending on the type of sound card you own, the Microsoft driver can cause some strange behavior. If you still have your original sound card software, I suggest that you reinstall the original drivers. If not, go to the Web site of the company that made your sound card and download the drivers from there.

Q My current shack PC is a 333-MHz Pentium II with 64 Mbytes of RAM and a 3-Gbyte hard drive. My son wants to run sophisticated gaming software on the computer when I'm not using it, and my wife would like to do a few things on the machine with *PhotoShop*. I'm considering the idea of pulling the motherboard and replacing it with a new 133-MHz bus board and 1 GHz CPU. Is this the most cost-effective approach?

A Motherboard and CPU prices have been plunging lately, but you'll still shell out about $600 for a good-quality 1-GHz motherboard/CPU combo. You can probably save more than $100 by purchasing a 933-MHz package. Believe me, you won't notice the performance differential between 933 MHz and 1 GHz. Clock speed isn't everything!

Here's another motherboard tip: the Intel 440BX motherboard chipset is "old" as far as the PC market is concerned, but I've measured it to be as fast, if not faster, than the newer 815E chipset. Go with a 440BX-chipset motherboard and you'll save a little cash without sacrificing performance.

You might consider expanding your memory to 256 Mbytes to accommodate future needs. Beware of cheap memory, however. You can find 256-Mbyte SDRAM for under $100, but there is memory and there is *memory*. Bargain-basement memory can drop data when you're cycling it at 133 MHz on your new motherboard. Just one dropped bit is enough to corrupt data and possibly trigger the dreaded "blue screen of death." This is the last thing you want to see, say, in the middle of a contest!

Definitely upgrade your hard drive. With drive prices falling through the floor these days, you have no excuse. You can find 30-Gbyte drives for less than $125. Stick with the high-speed (7200 RPM) drives and your programs will load at the speed of thought!

Q Jerry, KC8OTH, asks, "What does the 'dBi' mean when used to rate an antenna?"

A I will presume that you are somewhat familiar with the decibel. If not, at least a few numbers will put it into perspective. Decibel is a term that can compare two powers or voltage levels. The formulas are:

$dB = 10_{log}$ (P1/P2) where P1 and P2 are two power levels.

It can also compare voltages, if the voltages are at the same impedance. The formula is:

$dB = 20_{log}$ (V1/V2) where V1 and V2 are the two voltage levels.

(For "extra credit," if the resistances are not equal, you can use the formula $dB = 10_{log}$ $((V1^2/R1)/(V2^2/R2))$.

Now, in antenna gain, there are two common references. The first is an imaginary antenna called an "isotropic" radiator. This is an antenna that radiates equally in all directions. An isotropic radiator placed at the center of a sphere would illuminate the sphere equally. No such antenna exists in real life. A practical example of what is nearly an isotropic radiator is a light bulb.

When gain is expressed in dBi, it indicates how much louder a signal from that antenna will be *in the main beam of the antenna* than it would be if the same amount of power were applied to an isotropic radiator in free space. The thing to remember about gain is that an antenna develops gain by concentrating energy in one direction and not radiating energy in other directions. Two examples of gain are flashlights, and the technique of cupping your hands when you shout to make the sound louder in the desired direction.

A directional antenna such as a Yagi can have considerable gain. Typical HF Yagi beams can have 8 dBi gain or more; a large VHF or UHF beam can have 20 dBi gain, or even more.

Some easy numbers to remember are:

1 dB = 1.25 × power
2 dB = 1.6 × power
3 dB = 2 × power
10 dB = 10 × power

A 20-dBi-gain antenna would have 10 × 10 or 100 times the power gain of an isotropic radiator. One watt fed into a 20-dBi-gain antenna would be as loud as 100 W fed into an isotropic source, *but only in the direction the antenna is beaming*.

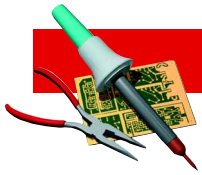
Decibels also work in the other direction, too. An antenna with –3 dBi "gain" actually has a loss of 3 dB—it will lose half of the power applied to it. An antenna that is –10 dBi is radiating $^1/_{10}$ the signal of one with 0 dBi gain; one that is –20 dBi is radiating $^1/_{100}$ the signal and so on. A –20 dBi gain antenna with 1 W fed to it would sound as loud as an isotropic antenna being fed with 10 mW.

Most H-Ts have antennas that are not very efficient. A gain of –10 dBi would be about typical. This can work very well if you are near a repeater, but if you are right at the edge of a repeater's range, or operating simplex over a few miles, this will not give a very good signal; it will sound "scratchy" on the receiving end.

Another reference point is dBd, or referring the gain to a half-wave dipole in free space. The half-wave dipole in free space has a gain of 2.15 dBi, so gain expressed in dBd is always 2.15 dB less than gain expressed in dBi. Don't worry, the gain of the antenna is the same in both cases, only the reference has changed. If you want to compare an antenna whose gain is in dBd to one whose gain is in dBi, add 2.15 to the gain of the antenna in dBd.

I don't want to make it too complicated, but I will add that most antenna gain figures tell you what the antenna would be if it were in free space—infinitely far away from the Earth. In the real world, the ground affects the antenna performance by reflecting signals upward. This actually adds up to about 5 dB to the gain of an antenna. So, a half-wavelength dipole over ground can actually have about 5 dBd of gain! Slick, eh? The half-wavelength dipole over ground has 5-dB gain over a half-wave dipole in free space.

Do you have a question or a problem? Ask the doctor! Send your questions (no telephone calls, please) to: "The Doctor," ARRL, 225 Main St, Newington, CT 06111; doctor@arrl.org; www.arrl.org/tis/. QST



By Ben Moses, W6FY

The Saga of Unshielded Wires

RFI is RFI, no matter what the era or how nostalgic our memories. Not surprisingly, the cures are pretty similar, too. Armed with a little technology and a cool head, you can tame even the most ferocious neighbors!

In 1957, at the beginning of the International Geophysical Year and the best sunspot cycle in recorded history, a 15-year-old ham finally saved enough money to put a Heathkit DX-100 on the air and start chasing DX. When the first IGY exploration base went up on Antarctica that year, and young hams like me could sit in our Midwestern basements and ragchew with KC4AAA with 100 W and a dipole instead of doing our homework. We were learning geography, after all, and maybe science!

In the '50s, more than a few hams operated with the Faraday shields removed from their amplitude-modulated finals so they could watch the 6146s glow that cozy orange (some claimed a pair of 811-As could heat the shack in the dead of winter). The '50s also saw "TV sets" with 21-MHz IFs—and the only RF shielding in sight was the plywood and masonite box the receivers were housed in.

So, not coincidentally, 1957 was also the same year my TVI problems started. Otherwise friendly neighbors turned into The Hulk whenever I transmitted and they were watching TV. And my father was usually the one who got the call.

Once, I got lucky: I was working DX on 15 meters one Saturday afternoon when an irate neighbor called the house. Dad came clomping down the stairs—that was always a bad sign—but he was supportive of my hobby. When he relayed to her that I was talking to the military base on Kwajalein Island, she told him her husband was stationed there. In 10 minutes she was at my rig exchanging tearful "I love you's" across 7000 miles of ether on this strange "get-up" in our basement. In those days the phones didn't work between here and there, and mail took weeks one way. One foe had turned friend.

Not long after, I wasn't so lucky. Paul, W9JLL (now SK), famous among hams in the tri-state area for his open-rack homemade kilowatt and his Collins S-line, was the organist at the Baptist church across the alley from us. He knew of my struggles with TVI and sympathized, but when Dad picked up the phone this time, Paul was on the other end. I overheard something about a funeral in progress at the church and the organ speakers bleating out a distorted "CQ, CQ, CQ." Soon after that I got a friendly but firm lesson from Paul and a few local hams in shielding, antenna matching and the importance of low-pass filters. And the church organ got some new RF chokes on its speaker leads.

The Fuming Neighbor

That was 1957. But I don't think I ever got the "TVI/RFI as a social issue" thing down until recently, when—now sporting a kilowatt of my own—I answered the door at 11 PM one night and found an irate, livid and furious (not to understate his "state") next-door neighbor ready to strangle me with his bare hands. We had just moved into the neighborhood a few months earlier, and these neighbors had been over once to a summer backyard party, but we weren't close.

"Are you on the air right now?" Neighbor screamed. The kid from 1957 wanted to deny it, run and hide, anything; but this time there was no father down the hall to work things out for me.

"Yes," I answered, mustering all the neighborliness I could.

"Well, get off! I've been trying to talk to the emergency room for the last half an hour and you're tearing up my phone. My wife's sick, she's been in the hospital and you're preventing me talking to the doctor." I was shaken.

Trying to remember how a good neighbor (and not a criminal caught in the act) would respond, I said, "Consider me off the air as of now. And I'll stay off until you get everything taken care of. Take care of your wife, and don't worry about a thing." He stormed home and I closed the door and shut down the rig.

I answered the door at 11 PM one night and found an irate, livid and furious next-door neighbor ready to strangle me with his bare hands.

The next day was Saturday. Early that morning I pulled out the FCC regulations and read them. I checked my TV, stereo and telephones for interference. Yeah, there was some on the cheaper phones in the house—at high power—and the stereo could be induced to bleat if I drove the speech processor too hard.

I called a ham friend and, at his recommendation, picked up some telephone line filters from the local ham store. Then, mustering all the courage I could, I knocked on Neighbor's door. He answered it and proceeded to scream at me again. I tried to tell him why I was there and what the filters would do, but he wanted none of it. He didn't want any "junk" put on his telephone or stereo, and if I didn't get off his property this instant he would call the police…and…I'd better stay off the air period because he knew his rights and everything was all

my fault and he'd have the FCC shut me down. He slammed the door. He yelled that he had a fundamental right to a clear telephone line. I remember that. It wasn't in the regs, however.

No matter, that was the last sort of reception I had expected. I didn't know what to do next. I fumed and fussed and got angry and told myself I knew my own rights…I wondered if his wife really was sick…but I stayed off the air. I let a few days go by before I got on a friendly 222-MHz repeater and started asking questions. Someone mentioned the ARRL's *RFI Book*. Someone else suggested winding some chokes for ac and speaker lines. I bought the *RFI Book* and started reading. You're never too old to remember what you learned 40 years ago.

By then, a week after I'd been blown off the neighbor's front porch, I got a message on my answering machine. It was him, his voice filled with guilt, apologizing for how he'd acted. He'd be happy to try the filters if I'd forgive him for how he'd acted. It was a Sunday afternoon. Maybe he'd talked to someone about it.

Whew! First I called my friend Andy, WA6WXD. Not only does Andy have a lot of experience dealing with RFI, he's a deputy sheriff. I figured it wouldn't hurt to show up with a lawman at my side. Then I called the neighbor, accepted his apology, asked about his wife, and explained that Andy and I would like to debug his system. He agreed.

The Hunt Begins

It was the next Saturday before we could all get together. Andy arrived, armed with a 2-meter hand-held transceiver. We made a plan. He'd take the neighbor's house and I'd man my rig—staying out of the line of fire in case any emotions erupted. I was still a bit gun shy. We'd communicate on 146.52.

We started with the phones. I found a clear frequency on 20 meters, announced my presence and what we were up to, then listened on the H-T. Andy reported: Yep, they'd heard every word on the unshielded plastic phones next door. "Pretty loud," was the report. Time to try one of the filters.

In less than 60 seconds the in-line filter silenced the telephone. Andy went from phone to phone and my voice disappeared on all but one. On it he added a choke, and that did the trick.

The neighbor was amazed. I guess he didn't believe it. Andy, buoyed with success, moved to the stereo. Unfortunately, that didn't look so easy. The builder had run unshielded TV twinlead through the walls to built-in speakers throughout the house! And sure enough, using anything more than 100 W put my sideband voice into every room.

Andy came back to my house, suggesting that we might be at this awhile. The neighbor, sensing our mood change, began showing signs of becoming The Hulk again. But Andy was methodical. He retrieved a couple of shielded audio cables from my shack and returned to the stereo, where he started the process by pulling all the inputs to the tuner/preamp.

"Try it now," I heard on my H-T. I transmitted. No difference. He removed the cables from the tuner to the amp.

"Again." I keyed the mike and counted to 10.

"Transmit, Ben," I heard on my H-T. I keyed the H-T.

"I just did."

"Really? Do it again."

I repeated my call sign a few times on 20 meters at high power.

"Hang on," Andy said. He connected my shielded audio cables between the tuner and the amp. I transmitted again. Then I heard, "I think we got it!"

And it was that easy. The cables the neighbor had used between his tuner and audio amp were unshielded, offering a perfect low-level place to inject any nearby RF! Swap swap—and we were done.

The neighbor was at first suspicious, then amazed, then all smiles. Probably pretty chagrined, too. The very idea that something could be changed on *his* equipment to solve the problem probably hadn't been believable until the facts were in.

We tested every power setting and every HF band I had an antenna for. Andy let the neighbor turn his stereo up all the way and listen to all his telephones. My neighbor finally came to believe that I really *was* transmitting even though he couldn't hear me. Case solved.

Cooperation Counts

In the process I definitely learned the importance of having a vibrant ham community. The guys on 222 had given me lots of good advice and moral support. And I couldn't have done it without Andy. He had a clear head and wasn't emotionally involved in the issue while I was bouncing between anger and intimidation.

…no matter how much you know about solving RFI problems, you can't do it without the cooperation of the "offended party."

It's clear, too, that no matter how much you know about solving RFI problems, you can't do it without the cooperation of the "offended party." You have to keep a cool head and be nice, no matter what. Advising them of your rights in an excited tone of voice doesn't get you anywhere. I'd have never received an apology—and the opening I needed to solve the problem—if I'd met fury with fury when the neighbor blew up. And I sure wanted to.

I'll admit, after the incident, we never became the best of friends, but he did tell me they wanted to invite us over for dinner sometime soon. I guess we moved away before they got around to it.

We recently moved into a new house, and this time my wife has made me promise to invite all the neighbors to a housewarming party before I hook up the amp or put up the beam. She wants me to explain ham radio to them, talk about RACES and emergency preparedness, earthquakes, and work a little DX on the little dipole that's hiding in the trees. Then I can tell them I've got this big antenna that's going to block their view of the sky, and if they notice any RFI…

I'm sure I'll get around to it someday soon.

9801 Amestoy Ave
Northridge, CA 91325-1919
w6fy@arrl.net

STRAYS

PHONE PATCH SANTAS WANTED

◊ Amateur Radio operators with phone patch capability are needed to act as "Santas on the Air" to hospitalized children during Christmas 2001. Planning begins now. If you will be available to help, please contact: Duane Wyatt, WA0MJD, 522 Central Ave, PO Box 388, Grant, NE 69140; **wyattfive@panhandle.net**.

Previous Strays

2001 Super Frequency List CD-ROM

With so many HF transceivers sporting general-coverage receivers these days, hams often find themselves venturing outside their usual haunts to listen to what the rest of the radio world is doing. There is a lot going on below 30 MHz—including hundreds of utility stations of various types and nearly as many domestic and international broadcast outlets. You can tune the bands and find some interesting "catches" by chance, or you can improve your odds substantially by using a frequency guide.

Klingenfuss Publications produces separate annual shortwave and utility station guides in the form of thick books available from the ARRL and other sources. But if you prefer your information in electronic form, Klingenfuss combines both lists on a single CD-ROM for *Windows*—the *2001 Super Frequency List.*

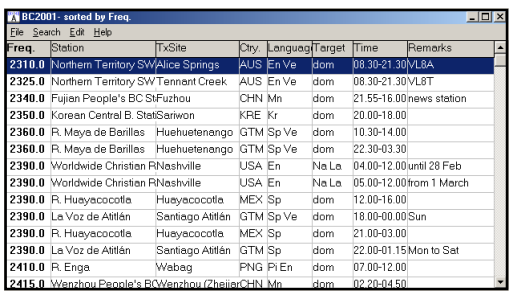
Set Up and Use

The *2001 Super Frequency List* CD-ROM contains 10,200 domestic and international broadcast frequencies, 10,900 utility station frequencies and 17,900 "formerly active frequencies."

You can run the lists directly from the CD. Using the **RUN** selection under the *Windows* Start menu, you can select either the English or German language opening menus. From there you can access the broadcast, utility or formerly used frequency databases.

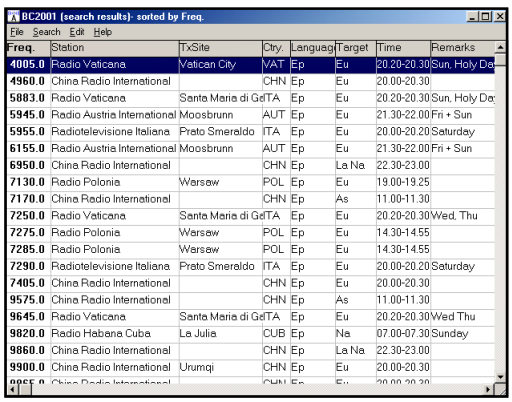
Once you select your database, you can sort the entries by frequency, call sign, country, language, time or (in the case of the utility stations) modulation type. This feature is convenient when you want to page through the list in a particular order (sorting and listing by frequency is particularly handy).

I found the "word search" function to be the most useful.



Freq.	Station	TxSite	Ctry.	Languag	Target	Time	Remarks
2310.0	Northern Territory SW	Alice Springs	AUS	En Ve	dom	08.30-21.30	VL8A
2325.0	Northern Territory SW	Tennant Creek	AUS	En Ve	dom	08.30-21.30	VL8T
2340.0	Fujian People's BC St	Fuzhou	CHN	Mn	dom	21.55-16.00	news station
2350.0	Korean Central B. Stati	Sariwon	KRE	Kr	dom	20.00-18.00	
2360.0	R. Maya de Barillas	Huehuetenango	GTM	Sp Ve	dom	10.30-14.00	
2360.0	R. Maya de Barillas	Huehuetenango	GTM	Sp Ve	dom	22.30-03.30	
2390.0	Worldwide Christian R	Nashville	USA	En	Na La	04.00-12.00	until 28 Feb
2390.0	Worldwide Christian R	Nashville	USA	En	Na La	05.00-12.00	from 1 March
2390.0	R. Huayacocotla	Huayacocotla	MEX	Sp	dom	12.00-16.00	
2390.0	La Voz de Atitlán	Santiago Atitlán	GTM	Sp Ve	dom	18.00-00.00	Sun
2390.0	R. Huayacocotla	Huayacocotla	MEX	Sp	dom	21.00-03.00	
2390.0	La Voz de Atitlán	Santiago Atitlán	GTM	Sp	dom	22.00-01.15	Mon to Sat
2410.0	R. Enga	Wabag	PNG	Pi En	dom	07.00-12.00	
2415.0	Wenzhou People's BC	Wenzhou (Zhejiar	CHN	Mn	dom	02.20-04.50	

The broadcast list sorted by frequency.



Freq.	Station	TxSite	Ctry.	Languag	Target	Time	Remarks
4005.0	Radio Vaticana	Vatican City	VAT	Ep	Eu	20.20-20.30	Sun, Holy Da
4960.0	China Radio International		CHN	Ep	Eu	20.00-20.30	
5883.0	Radio Vaticana	Santa Maria di Ga	ITA	Ep	Eu	20.20-20.30	Sun, Holy Da
5945.0	Radio Austria International	Moosbrunn	AUT	Ep	Eu	21.30-22.00	Fri + Sun
5955.0	Radiotelevisione Italiana	Prato Smeraldo	ITA	Ep	Eu	20.00-20.20	Saturday
6155.0	Radio Austria International	Moosbrunn	AUT	Ep	Eu	21.30-22.00	Fri + Sun
6950.0	China Radio International		CHN	Ep	La Na	22.30-23.00	
7130.0	Radio Polonia	Warsaw	POL	Ep	Eu	19.00-19.25	
7170.0	China Radio International		CHN	Ep	As	11.00-11.30	
7250.0	Radio Vaticana	Santa Maria di Ga	ITA	Ep	Eu	20.20-20.30	Wed, Thu
7275.0	Radio Polonia	Warsaw	POL	Ep	Eu	14.30-14.55	
7285.0	Radio Polonia	Warsaw	POL	Ep	Eu	14.30-14.55	
7290.0	Radiotelevisione Italiana	Prato Smeraldo	ITA	Ep	Eu	20.00-20.20	Saturday
7405.0	China Radio International		CHN	Ep	Eu	20.00-20.30	
9575.0	China Radio International		CHN	Ep	As	11.00-11.30	
9645.0	Radio Vaticana	Santa Maria di Ga	ITA	Ep	Eu	20.20-20.30	Wed Thu
9820.0	Radio Habana Cuba	La Julia	CUB	Ep	Na	07.00-07.30	Sunday
9860.0	China Radio International		CHN	Ep	La Na	22.30-23.00	
9900.0	China Radio International	Urumqi	CHN	Ep	Eu	20.00-20.30	

The word search function allows you to generate lists sorted by specific criteria. In this instance, I asked for a list of all Esperanto broadcasts, sorted by frequency.

The *Super Frequency List* opening menu.

Rather than just re-sorting the entire list in a particular order, word search creates a new list consisting of only the target information specified in your search. For example, let's say that you want a list of all station broadcasts in Esperanto. (I actually attempted to learn Esperanto once. It's a tragic story.) You enter the language code from the drop-down list ("ep" for Esperanto), click on the **OK** button and within milliseconds you are presented with a list of all known times and frequencies of all Esperanto broadcasts. In case you're curious, the *2001 Super Frequency List* turned up 27 entries in my search; Radio China International seems especially fond of Esperanto—go figure.

A Comprehensive Tool

The *2001 Super Frequency List* is an excellent timesaving tool to have on hand whenever you want to cruise the airwaves. The information is highly accurate—even for some of the more obscure utility and broadcast outlets. You'll find signals you never knew existed and recapture the pleasure of listening to the voices of other nations and cultures.

The CD-ROM runs from just about any *Windows*-equipped PC. It ran as easily on my old 133-MHz Pentium laptop as it did on my 933 MHz desktop machine. For the desktop I loaded the entire CD-ROM onto my hard drive—all 567 Mbytes of it. By doing so, I could run the *Super Frequency List* without having the CD-ROM in the drive. My only nit to pick with the *Super Frequency List* on CD-ROM is that it does not allow you to print any portions of the lists, even the limited results of a word search. Unless you have a computer within easy reach, you'll have to jot the results down on paper or do a copy-and-paste to *Notepad* before you head for your receiver.

Manufacturer: Klingenfuss Publications, Hagenloher Str 14, D-72020 Tuebingen, Germany; tel 49-7071-62830; **www.klingenfuss.org**. *The 2001 Super Frequency List CD-ROM is available from the ARRL for $24.95, shipping additional. Call 860-594-0355, or shop on line at* **www.arrl.org/shop/**. QST

Steve Ford, WB8IMY ♦ QST Managing Editor

By Al Alvareztorres, AA1DO

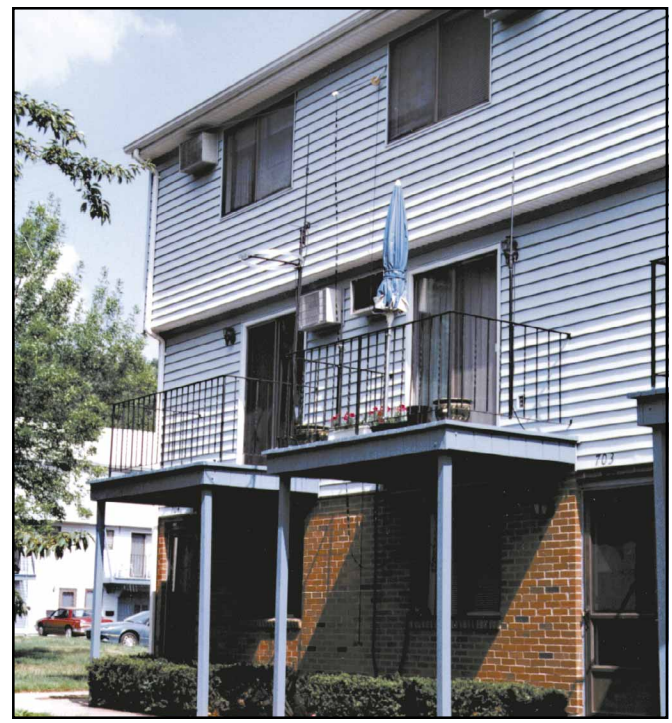
The Care and Feeding of a Condo Antenna Farm

A little diplomacy, and a good measure of "stealth technology," go a long way.

In the mid-1980s my wife and I bought a townhouse condominium. We knew from the very beginning that the association rules forbade outside antennas. You couldn't even attach a temporary antenna to your balcony.

I installed a mobile HF station in the car while thinking of the possibilities of a station at home—something that might push the envelope of the association rules while staying well within the *spirit* of those rules. I was fortunate that the front of our four-townhouse building faced away from the rest of the complex, making it somewhat easy to keep things from general view. The real trick would be putting up some antennas in that space that *worked*.

My first attempt at a condo antenna farm was a partial failure. I had an old 20-foot Gotham bottom-loaded vertical antenna (remember the Gothams?) with taps on the loading coil for several bands. In a feeble attempt to hide the antenna, I planted it in the ground about two feet from the building between our balcony and the one next door. The performance was just this side of abysmal. I also installed a 2-meter Cushcraft Ringo Ranger antenna on the balcony railing and sprayed it with flat black paint—my first stealth antenna. The antenna was fine for local VHF work, but my HF fun was still taking place in the car.



You have to look closely to see the antennas in this view of my condo—and that's the idea!

The Stealth Wire

Some time later a fellow at our local club suggested I put up a random-wire antenna made from very thin wire. Since I was working at a company that made transformers at the time, it was simple to get the "spool ends." These could have over 200 feet of wire left on them!

I settled on #24 enameled wire for strength vs stealth. Running a short length of coax out the window, I attached the antenna wire to the center conductor. Being careful to reconnoiter the area for hidden power lines or other hazards, I snaked the wire up the side of my building to the third floor, but I wasn't done yet. I had plenty of wire remaining—more than enough to jump the gap to a distant tree.

I used a white shirt-button insulator to make the transition between the end of the antenna wire and a length of monofilament fishing line. The other end of the fishing line was tied to a wrench, which I tossed over the limbs of the target tree. Pulling slowly, I raised the remaining antenna wire to a horizontal position between my condo and the tree, then tied off the fishing line on a nail in the tree trunk.

This antenna worked—sort of. It blessed me with RF in my shack, but quite a few signals in the bargain. I had to repair it often, but at least I was making contacts. I ceremoniously "installed" the ancient Gotham on the scrap pile in the garage.

The Arrival of the Condo Police

A couple of years later a new board member was elected. He was an elderly gentleman who seemed to occupy his time by roaming the complex in search of association rule violations. Soon the residents were peppered with missives from The Association warning of infractions. Bicycles were not to be stored in the balconies, pool towels were not to be draped on the balcony railings, no bird feeders were allowed, etc. Finally, it was my turn—my antennas had to be removed immediately. After about seven years of Amateur Radio bliss, I had been "discovered."

Ironically, the president of the board lived across the way

in plain view of the long wire and had never noticed it. Other than our eagle-eyed enforcer, no one had ever noticed it except my immediate neighbors (the antenna passed several feet in front of their bedroom window).

Pleading my Case

I requested to attend the following board meeting and my request was granted. A couple of weeks later, my wife Donna, AA1DQ, and I came home from work, prepared to face the judges. Since we both had office jobs, we were wearing business suits as we walked across the parking lot to the president's unit for the meeting. (Don't knock the suits. Impressions count!)

My latest VHF antenna additions: an AEA 6-meter Halo with a 2-m/70-cm antenna above it. Note that everything except the Halo is painted black to blend in with the balcony railing.

The 450-Ω ladder line finds its way into the condo through two banana jacks and plugs.

As an armchair legal maven, I isolated two association rules that I felt would present the thorniest obstacles to our success (the emphasis is mine):

"2. Owners shall not use...their premises in any manner that would be **disturbing** or be a **nuisance** to other Owners or in such a way as to be **injurious to the reputation of the property.**

"8. Unit owners shall not cause or permit anything to be displayed on the outside...of walls of the building, and no sign, **awning**, **canopy**, shutter, **radio or television antenna shall be affixed to or placed upon the exterior walls**...**or any part thereof..."**

Everyone at the meeting was very polite, in fact friendly, when they pointed out that we were in violation of the rules—no antennas were allowed and there was to be nothing attached to the balconies. I agreed, keeping the atmosphere of friendliness (I felt this was of utmost importance if we were going to win). However, I pointed out that it was obvious that the purpose of the association rules is to preserve the appearance of the areas and protect the value of the properties. I emphasized the *spirit* of the rules. They agreed, and I think this gave me the upper hand.

I started by telling them that the Federal Communications Commission licensed both Donna and me to operate our equipment, and that we had taken qualification tests. Also, by mandate, in time of emergency my equipment was at the disposal of the complex if needed. I told them that I had performed experiments with my immediate neighbors and was causing no interference.

These comments raised a buzz of conversation. One board member said, "Oh, we didn't realize that you had passed FCC exams, and that you had already conducted interference tests. Very impressive." The first obstacle (rule #2) was out of the way.

I continued by reminding the board that we were *owners* and not renters, and therefore extremely interested in maintaining the value of the properties. I then turned to a nearby sliding glass door and gestured to a unit across the parking lot. I drew their attention to the fact that the screen on my neighbor's kitchen window was in disrepair and had been so for at least a year. Was this not an eyesore? Our unit, in contrast, was immaculate. And could my antenna (speaking of the long-wire) be an eyesore when it had taken so many years to be even noticed? The dipole is almost invisible to the majority of the complex. Were we not living up to the spirit of the rules?

In addition, I mentioned that most of our neighbors had sun umbrellas attached to their balcony railings. If we were to enforce rule #8 equitably, couldn't we insist that our neighbors remove their umbrellas? Of course not. The logic of this argument also caused a buzz among the members. They discussed my appeal among themselves for a few moments.

The president moved that the rules be changed. All but one board member agreed—the condo policeman, of course. He made a strong "slippery slope" argument that officially allowing one type of antenna in the rules would soon result in a forest of CB groundplanes, DBS satellite dishes and more. The board president suggested a compromise: the rules would not be changed, but in the case of my antennas the board would "look the other way."

I had lost the war, but I had won the battle, and an armistice was agreed upon—one that holds to this day.

Compromise and civility were the keys to my "victory." I never made demands. I never asserted my "rights." If they had demanded that I remove my antennas, they would have come down and I would have continued operating mobile and portable. I sincerely admitted I was in the wrong. My case was that I was doing no harm—and, in fact, might do some good. If you go into these situations with a belligerent state of mind, the battle is probably lost before you begin.

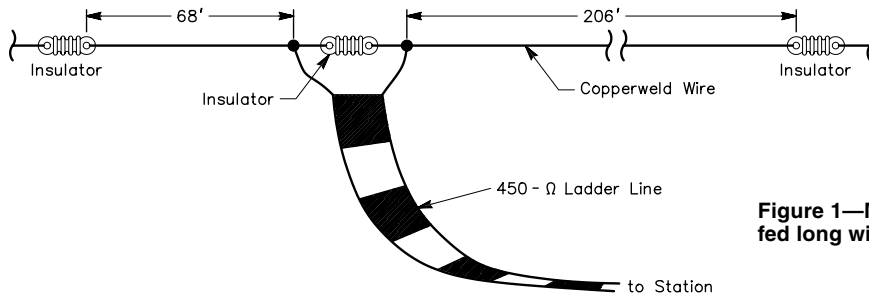


Figure 1—My version of the off-center-fed long wire antenna.

The Off-Center-Fed Longwire

With the Commissar off my case, it was time to turn my attention back to improving my HF antenna. My newfound confidence urged me to start looking for a replacement. With that trusty tree over 200 feet away, off to one side, and a line of trees about 60 feet away running parallel to the building, the lay of the land just begged for a better multiband antenna. But it would be almost impossible to put up a standard, flattop, center-fed dipole on any band.

I found a candidate in *W1FB's Antenna Notebook* (see Figure 1). It was an off-center fed long-wire, which I cut to a full wavelength on the CW portion of the 80-meter band. The total length is about 274 feet. The antenna is fed 1/4 wavelength (on 80-meters) from one end (at about the 68-foot point). Perfect! I could run the long leg to the far tree and the short leg to a tree across the front lawn. According to the article, this configuration used coax to feed it, so I followed suit.

I figured that if I was going to "push the envelope" I might as well go first class, so I used Copperweld antenna wire, purchased proper insulators and black Dacron rope (the rope would be camouflaged within the tree limbs anyway). The antenna has a somewhat awkward appearance: although the long leg is almost parallel to the ground, there is a slight rise in elevation. It is attached to the building at about 30 feet, and to the far tree at a height of 40 or 50 feet. The short leg goes off at about 45° away from the building and also about 45° down to a small tree.

The antenna worked well on several, but not all bands from 160 to 15 meters. After using this antenna for two or three years, I decided to switch the feed line from coax to 450-Ω ladder-line. The antenna now tunes on all bands from 160 to 10 meters and has worked all continents and all areas of the US using 100 W. I operate almost exclusively on CW to maintain a low profile, and only use the 500-W amplifier occasionally, late at night, to break a pileup.

Since the antenna is a somewhat drooping horizontal **V**, I was able to counterweight it in the center using a plastic pulley to protect it from occasional high winds and snow loading. Dacron rope is used to connect to a chain that holds three old window sash weights that I got from a friend when he remodeled his old house.

A few more VHF antennas have been added to the original 2-meter Ringo: an AEA 6-meter Halo with a 2-m/70-cm antenna above it, and a 220 MHz Ringo. The coax feed lines from the VHF antennas are tie-wrapped together and form a drip loop, as does the ladder-line from the dipole. The ladder-line is twisted about every 18 inches to present a smaller profile to the wind.

Feeding the Feed Lines

The feed lines enter the family room via a sliding window.

My improvised "window treatment" passes several coaxial feed lines and my ground wire.

I cut a board to size and installed coaxial feed-throughs. The board was sealed against the weather with silicone windshield sealer (bathtub sealer will do, also). Where the two windows no longer meet in the center, I placed a Styrofoam strip between the metal frame of the inner window and the glass of the outer window. A strip of wood jammed between the open window and the frame locks it securely. The ladder-line passes into the condo using heavy-duty banana plugs and sockets found at a local stereo store.

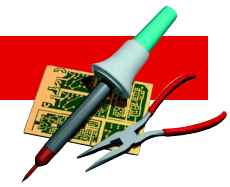
Of course, all the equipment in the station is grounded together. I used the shield from discarded RG-8 to make straps. These are then soldered to busses made from the same material along the back of the shelves. The straps were then soldered to grounding wire, which exits the window to three ground rods placed about one foot apart.

You *Can* do Amateur Radio from a Condo

Hamming from a condo or apartment is not only possible, it's enjoyable! A little common sense and courtesy toward your neighbors is essential. For instance, I usually stay off the air during prime TV viewing hours, or during major TV events. I maintain my antennas frequently, to keep them as unobtrusive as possible. Co-existence is the key word. I don't publicize that I'm a ham, but I don't hide it either.

Occasionally there are comments from inquisitive neighbors. Once, when asked what the long wire was for, I offhandedly replied, "It's a short-wave antenna." The curiosity usually stops right there.

225 Main St
Newington, CT 06111
aa1do@arrl.org



International Third–Party Traffic

Occasionally, DX stations may ask you to pass a third-party message to a friend or relative in the States. This is all right as long as the US has signed an official third-party traffic agreement with that particular country, or the third party is a licensed amateur. The traffic must be noncommercial and of a personal, unimportant nature. During an emergency, the US State Department will often work out a special temporary agreement with the country involved. But in normal times, never handle traffic without first making sure it is legally permitted.

US Amateurs May Handle Third-Party Traffic With:

C5	The Gambia	J7	Dominica	VE	Canada
CE	Chile	J8	St Vincent and the Grenadines	VK	Australia
CO	Cuba	JY	Jordan	VP6**	Pitcairn Island
CP	Bolivia	LU	Argentina	XE	Mexico
CX	Uruguay	OA	Peru	YN	Nicaragua
D6	Federal Islamic Republic of the Comoros	PY	Brazil	YS	El Salvador
DU	Philippines	TA	Turkey	YV	Venezuela
EL	Liberia	TG	Guatemala	ZP	Paraguay
GB*	United Kingdom	TI	Costa Rica	ZS	South Africa
HC	Ecuador	T9	Bosnia-Herzegovina	3DA	Swaziland
HH	Haiti	V2	Antigua and Barbuda	4U1ITU	ITU Geneva
HI	Dominican Republic	V3	Belize	4U1VIC	VIC, Vienna
HK	Colombia	V4	St Christopher and Nevis	4X	Israel
HP	Panama	V6	Federated States of Micronesia	6Y	Jamaica
HR	Honduras	V7	Marshall Islands	8R	Guyana
J3	Grenada			9G	Ghana
J6	St Lucia			9L	Sierra Leone
				9Y	Trinidad and Tobago

Notes

*Third-party traffic permitted between US amateurs and special-events stations in the United Kingdom having the prefix GB only, with the exception that GB3 stations are not included in this agreement.

**Since 1970, there has been an informal agreement between the United Kingdom and the US, permitting Pitcairn and US amateurs to exchange messages concerning medical emergencies, urgent need for equipment or supplies, and private or personal matters of island residents.

US licensed amateurs may operate in the following US territories under their FCC license:
The Northern Marianas Islands, Guam, Johnston Island, Midway Island, Kure Island, American Samoa, Wake Island, Wilkes Island, Peale Island, The Commonwealth of Puerto Rico and the US Virgin Islands.

Please note that the Region 2 Division of the International Amateur Radio Union (IARU) has recommended that international traffic on the 20 and 15-meter bands be conducted on the following frequencies:

14.100-14.150 MHz
14.250-14.350 MHz
21.150-21.200 MHz
21.300-21.450 MHz

The IARU is the alliance of Amateur Radio societies from around the world; Region 2 comprises member-societies in North, South and Central America, and the Caribbean.

Note: At the end of an exchange of third-party traffic with a station located in a foreign country, an FCC-licensed amateur must transmit the call sign of the foreign station as well as his own call sign.

The RST System

Readability

1—Unreadable.
2—Barely readable, occasional words distinguishable.
3—Readable with considerable difficulty.
4—Readable with practically no difficulty.
5—Perfectly readable.

Signal Strength

1—Faint signals, barely perceptible.
2—Very weak signals.
3—Weak signals.
4—Fair signals.
5—Fairly good signals.
6—Good signals.
7—Moderately strong signals.
8—Strong signals.
9—Extremely strong signals.

Tone

1—Sixty-cycle ac or less, very rough and broad.
2—Very rough ac, very harsh and broad.
3—Rough ac tone, rectified but not filtered.
4—Rough note, some trace of filtering.
5—Filtered rectified ac but strongly ripple-modulated.
6—Filtered tone, definite trace of ripple modulation.
7—Near pure tone, trace of ripple modulation.
8—Near perfect tone, slight trace of modulation.
9—Perfect tone, no trace of ripple of modulation of any kind.

If the signal has the characteristic steadiness of crystal control, add the letter X to the RST report. If there is a chirp, add the letter C. Similarly for a click, add K. (See FCC Regulations §97.307, Emissions Standards.) The above reporting system is used on both CW and voice; leave out the "tone" report on voice.

Next Help Desk

By Steve Ford, WB8IMY

TV on 10

The 10-meter band is paradise if you want to talk to the world with low power and small antennas. Why not swap pictures while you're at it?

Perhaps you haven't seen TV on the HF bands, but I'm willing to bet that you've heard it. Have you ever tuned your radio in the vicinity of 14.230 MHz, only to hear…

Squeeeeeeeeee…brrrrrrr…squee-squee-squee

…on and on for what seems like a couple of minutes? That's a slow scan television (SSTV) signal. The station isn't sending a moving image. Instead, the operator is transmitting a still photograph (think fax, but in color).

Slow scan is *not* a new operating mode. In fact, it has been around for about 40 years. What *is* new is how easy SSTV has become for the average ham. In the "good old days" of SSTV, you needed specialized equipment such as monitors with long-persistence phosphor screens. The SSTV image would slowly "paint" onto these pale yellow or amber screens from top to bottom. Of course, the top of the image would be fading just as the bottom was completed. It was an amazing thing to see in its day, but we've come a long way since then.

What's the Big Deal About 10 Meters?

Most SSTV takes place on 20 meters, at or near 14.230 MHz. This has been true for decades. So why am I focusing on 10-meter SSTV?

SSTV is relatively simple from a hardware and software standpoint, thanks to personal computers. All you need to set up an SSTV station is an HF SSB transceiver and a computer equipped with a sound card. And 20-meters is a great place to "cut your teeth" on this mode (you'll find someone sending SSTV on 14.230 MHz at just about any time of day).

But…

Many amateurs are forced to operate under severe antenna restrictions. A 33-foot dipole antenna for 20 meters may not be feasible, especially if you live in an apartment or condominium. On the other hand, a 16-foot hank of wire for 10 meters, strung "creatively," is easier to accommodate. Such an antenna can fit in an attic, along a ceiling, among the clapboards and so on.

Twenty meters can become an awfully crowded band.

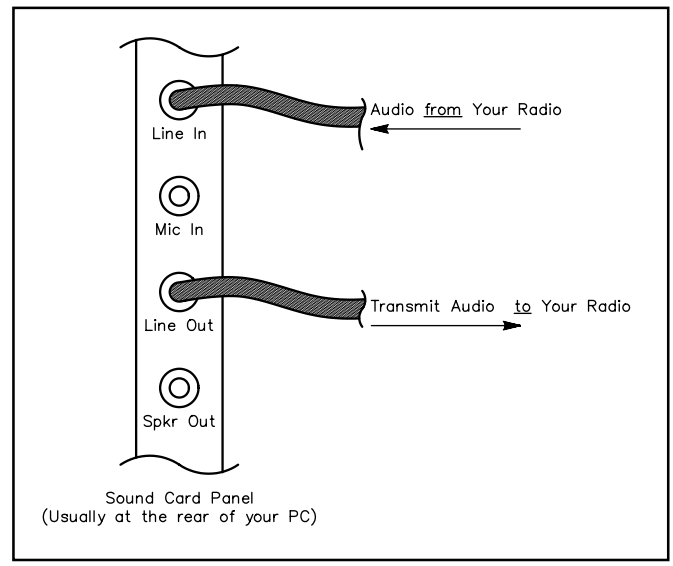


Figure 1—Connecting your sound card to your transceiver is relatively easy. You may need to use 1:1 isolation transformers in the audio lines if you experience hum in the transmit or receive signals.

SSTV Sound Card Software on the Web

ChromaPIX: www.siliconpixels.com
MMSSTV: www.geocities.com/mmhamsoft/
MSCAN: mscan.com/
W95SSTV: www.siliconpixels.com
WinPix32: www.skypoint.com/~k0heo/
Blaster SSTV (DOS, for slower PCs): www.hampubs.com/sstvwith.htm
QSSTV (for *Linux*): home.tiscalinet.be/on1mh_ham/
Multimode (for Macs): www.blackcatsystems.com/software/multimode.html

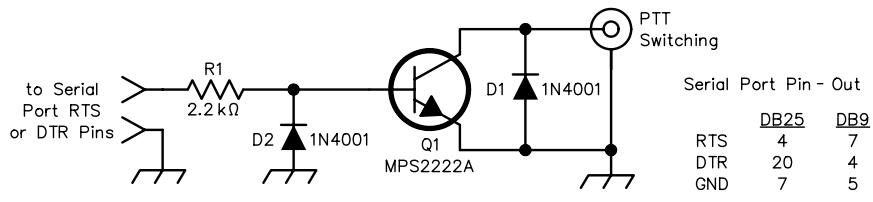


Figure 2—This simple circuit can be used to key your radio into the transmit mode from your computer's serial (COM) port.

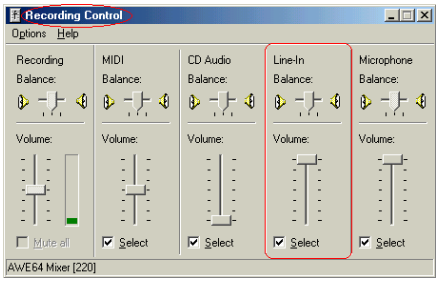


Figure 3—This is a typical sound card "mixer" window. Note that to adjust the *incoming* audio for the sound card, you must use the RECORDING controls. In this example, the line input (circled in red) is enabled and the gain is set to maximum.

Figure 4—If you see an image like this, you need to adjust your *slant* (see text).

G0FMO and I exchanged images on 10 meters using just 10 W. The image from England is noisy, but viewable. He is pointing to a copy of the image of my back yard that I just sent to him!

Not everyone you encounter on 10 meter SSTV is DX…

Weak-signal SSTV on 10 meters! This image was copied from DH2SAQ at 6:30 AM my local time. The signal audio was weak and the S meter was reading zero.

Interference is the order of the day and it often takes serious RF muscle to cut through the cacophony. Ten meters, in contrast, is like a wide-open prairie with room to roam. Better still, you don't need enormous amounts of power for global SSTV propagation. I've consistently worked SSTV on 10 meters with just 25 W. That's one of the attractions of 10 meters, as any veteran of the band will tell you.

The SSTV gathering place on 10 meters is 28.680 MHz, plus or minus 10 kHz. This is where you'll find DX SSTV, especially in the morning and early afternoon, local time. On 20 meters, operators often come together in groups (*nets*) to exchange SSTV images. On 10 meters, the emphasis is more on random, individual contacts. There is not a great deal of chitchat between 10-meter SSTV exchanges; usually no verbal conversation takes place at all. Because you're dealing primarily with international contacts, many of these operators do not speak fluent English—they prefer to let their images do the "talking." Their images frequently contain short English text greetings such as "good morning," or brief descriptions of the scene ("My home by the sea").

Setting Up for SSTV

To send an image over the HF airwaves, you need to convert the picture into audio tones that carry the necessary image information. Your station PC is ideally suited for this task. As long as it is a Pentium-class computer (a 100-MHz Pentium or faster) containing a sound card, you'll be able to use just about any SSTV software that's available today. (There is also SSTV software available for Macintosh and *Linux* platforms.) The SSTV software will do the image processing and your sound card will handle the chore of converting data to audio (and vice versa). See the sidebar "SSTV Software on the Web."

You can connect your PC sound card to your transceiver as shown in Figure 1. I prefer to use my rig's accessory jack to gain access to the receive and transmit audio connections. If your radio does not have such a jack, you can connect the transmit audio through your microphone connector and tap the receive audio at the external speaker jack.

I use my computer's COM port to place my radio in the transmit mode using the circuit shown in Figure 2. A more elegant solution is to bring all of your interfacing together with a single, dedicated unit such as the RIGBlaster from West Mountain Radio (18 Sheehan Ave, Norwalk, CT; tel 203-853-8080; www.westmountainradio.com). If you don't feel like soldering your own computer-to-radio interface circuitry, the RIGBlaster is definitely the way to go.

Whichever approach you use, make sure that you've set up the proper audio levels. You'll need enough receive audio for the sound card to process—and you'll need to make sure that the audio makes it to the sound card in the first place. Check your sound card audio mixer settings (see Figure 3). You want to view the **RECORD** settings at this point. Is the line or microphone input enabled and the "pot" turned all the way up?

When transmitting, adjust your **PLAYBACK** audio to avoid overdriving your radio. As a rule of thumb, increase the playback audio output until you see your radio's ALC meter/indicator begin to activate. Then, reduce the level slightly.

Scottie Who?

After you've loaded and configured your SSTV software, try to receive some images. You can try your luck on 10 meters to see what the band has in store, or fire up on 20 meters for a quick test. Just put your radio into the upper sideband mode and have at it.

Chances are, the first images you receive are going to look pretty awful! There are at least three reasons for this: *format*, *tuning* and *slant*.

SSTV operators use quite a variety of image transmission formats, depending on the application (more than 35 at last count). Most amateurs in the United States and Canada seem to prefer "Scottie 1." Much of the rest of the world uses a format known as "Martin 1." If you attempt to receive, say, a Martin 1 transmission using the Scottie 1 format, the result

Nils, SM5EEP, sent this image of his home in Sweden.

Another S-0 10-meter image, this time from Russia. Victor and I exchanged several images in the early morning before I had to drive off to work!

will resemble a Jackson Pollock painting on a bad day.

Seasoned SSTV operators can tell the difference between the two formats by the sounds of their respective signals. Even so, the custom is to announce the format before you begin sending the image ("Here comes the next photo. Scottie 1."). On 10 meters, however, such announcements are not common. Fortunately, most SSTV programs include the ability to identify the formats automatically. If automatic identification doesn't work, try switching formats manually. If you're receiving a DX signal, assume it is Martin 1—at least at first.

Just about every SSTV program I've seen so far includes some kind of tuning indicator. The first thing you need to learn is how to use it. Even if you have the correct format selected, you'll see nothing sane unless you have the signal tuned properly. Be patient with yourself; this takes time to master. Most tuning indicators mark where the 1200-Hz sync pulse should be. My personal technique is to tune the radio until I see the sharp spike of the sync pulse hovering right over that mark. In time you'll discover which method works for you, then it'll become second nature.

You have the signal tuned properly, and the correct format selected, but the image *still* looks hideous. Now what? If the picture appears slanted as shown in Figure 4, you need to make some fine adjustments to straighten everything out. Every pro-

A Slow-Scan TV Glossary

ATV—Amateur Television. Sending pictures by Amateur Radio. You'd expect this abbreviation to apply equally to fast-scan television (FSTV), slow-scan television (SSTV) and facsimile (fax), but it's generally applied only to FSTV.

AVT—Amiga Video Transceiver. (1) Interface and software for use with an Amiga computer, developed by Ben Blish-Williams, AA7AS, and manufactured by Advanced Electronic Applications (AEA); (2) a family of transmission modes first introduced with the AVT product.

Back porch—The blank part of a scan line immediately following the horizontal sync pulse.

Chrominance—The color component of a video signal. NTSC and PAL transmit color images as a black-and-white compatible luminance signal along with a color subcarrier. The subcarrier phase represents the hue and the subcarrier's amplitude is the saturation. Robot color modes transmit pixel values as luminance (Y) and chrominance (R-Y [red minus luminance] and B-Y [blue minus luminance]) rather than RGB (red, green, blue).

Demodulator—For SSTV, a device that extracts image and sync information from an audio signal.

Field—Collection of top to bottom scan lines. When interlaced, a field does not contain adjacent scan lines and there is more than one field per frame.

Frame—One complete scanned image. The Robot 36-second color mode has 240 lines per frame. NTSC has 525 lines per frame with about 483 usable after subtracting vertical sync and a few lines at the top containing various information.

Frame Sequential—A method of color SSTV transmission which sent complete, sequential frames of red, then green and blue. Now obsolete.

Front porch—The blank part of a scan line just before the horizontal sync.

FSTV—Fast-Scan TV. Same as common, full-color, motion commercial broadcast TV.

Interlace—Scan line ordering other than the usual sequential top to bottom. For example, NTSC sends a field with just the even lines in 1/60 second, then a field with just the odd lines in 1/60 second. This results in a complete frame 30 times a second. AVT "QRM" mode is the only SSTV mode that uses interlacing.

Line Sequential—A method of color SSTV transmission that sends red, green, and blue information for *each sequential scan line.* This approach allows full-color images to be viewed during reception.

Luminance—The brightness component of a video signal. Usually computed as Y (the luminance signal) = 0.59 G (green) + 0.30 R (red) + 0.11 B (blue).

Martin—A family of amateur SSTV transmission modes developed by Martin Emmerson, G3OQD, in England.

NTSC—National Television System Committee. Television standard used in North America and Japan.

PAL—Phase alteration line. Television standard used in Germany and many other parts of Europe.

Pixel—Picture element. The dots that make up images on a computer's monitor.

P7 monitor—SSTV display using a CRT having a very-long-persistence phosphor.

RGB—Red, Green, Blue. One of the models used to represent colors. Due to the characteristics of the human eye, most colors can be simulated by various blends of red, green, and blue light.

Robot—(1) Abbreviation for Robot 1200C scan converter; (2) a family of SSTV transmission modes introduced with the 1200C.

Scan converter—A device that converts one TV standard to another. For example, the Robot 1200C converts SSTV to and from FSTV.

Scottie—A family of amateur SSTV transmission modes developed by Eddie Murphy, GM3SBC, in Scotland.

SECAM—Sequential color and memory. Television standard used in France and the Commonwealth of Independent States.

SSTV—Slow Scan Television. Sending still images by means of audio tones on the MF/HF bands using transmission times of a few seconds to a few minutes.

Sync—That part of a TV signal that indicates the beginning of a frame (vertical sync) or the beginning of a scan line (horizontal sync).

VIS—Vertical Interval Signaling. Digital encoding of the transmission mode in the vertical sync portion of an SSTV image. This allows the receiver of a picture to automatically select the proper mode. This was introduced as part of the Robot modes and is now used by all SSTV software designers.

Wraase—A family of amateur SSTV transmission modes first introduced with the Wraase SC-1 scan converter developed by Volker Wraase, DL2RZ, of Wraase Electronik, Germany.

Table 1
SSTV Modes

Group	*Name*	*Color*	*Transmission Time (sec)*	*Scan Lines*
AVT	24	RGB	24	120
	90	RGB	90	240
	94	RGB	94	200
	188	RGB	188	400
	125	BW	125	400
Martin	M1	RGB	114	240
	M2	RGB	58	240
	M3	RGB	57	120
	M4	RGB	29	120
	HQ1	YC	90	240
	HQ2	YC	112	240
Pasokon	P3	RGB	203	16+480
	P5	RGB	305	16+480
	P7	RGB	406	16+480
	PD 240	YC	248	480
	PD 180	YC	187	480
	PD 160	YC	161	384
	PD 120	YC	126	480
	PD 90	YC	90	240
Robot	12	YC	12	120
	24	YC	24	120
	36	YC	36	240
	72	YC	72	240
Scottie	S1	RGB	110	240
	S2	RGB	71	240
	S3	RGB	55	120
	S4	RGB	36	120
	DX	RGB	269	240
Wraase SC-1	24	RGB	24	120c
	48	RGB	48	240
	96	RGB	96	240
Wraase SC-2	30	RGB	30	128
	60	RGB	60	256
	120	RGB	120	256
	80	RGB	180	256

Color Type:
RGB—Red, Green and Blue components sent separately.
YC—Sent as Luminance (Y) and Chrominance (R-Y and B-Y).
BW—Black and White

gram includes a slant adjustment. Tweak this adjustment while receiving a number of images. Once again, be patient. It's easy to over-correct. The goal is to have a display with perfectly vertical edges on each side. The good news is that after you've adjusted the slant to your satisfaction, you may never need to do it again unless you install a new sound card. Just don't forget to save your slant settings when you're done (some programs *do not* remind you to do so!).

But What do I Send?

You need to create a collection of treasured images! There are a number of ways to do this:

- Buy or borrow a digital camera and start snapping photos of everything in sight: Yourself, your cat, your irate neighbors, whatever strikes your fancy. You do not need to invest in a multi-megapixel camera with every feature known to man. Even a cheapie (less than $100) digital camera is fine for grabbing images for your SSTV vault.
- Buy or borrow a flatbed scanner and scan everything in sight.
- Take a pile of photo prints to your local photo processor and ask them to scan the pictures to disk for you in either JPG or BMP format. Many outlets now provide this service.

Once the images are safely housed on your hard drive, your SSTV software can grab them at will. This will allow you to share the image of your new motorized fertilizer spreader with an amateur in, say, Greenland.

It helps to add text to your images to explain what you are attempting to show. (The function of a fertilizer spreader may not be immediately obvious to an amateur in Greenland.) Most SSTV programs have accessory functions that allow you to add text. Don't get carried away, though. SSTV images are small, so use large lettering. Don't try to squeeze your latest quantum theory of gravity into the lower right corner.

Remember that many of your contacts on 10 meters may understand little or no English. Use your image text to communicate in simple terms. For example: "UR 595 in Chicago, Illinois. Name is Dave." Your partner may want to chat with you verbally between images, but have some "non-verbal" backups in your collection just in case.

Enjoy!

SSTV is a hoot no matter what band you're on. There is something almost magical about receiving a picture from another country, thousands of miles from where you call home. It seems to happen to me more often on 10 meters, and usually when I least expect it. The band may seem utterly dead when, without warning, I'll hear the high-pitched song of an SSTV signal reaching my meager antenna from the other side of the world.

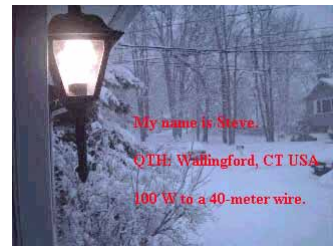
Yes, noise and fading sometimes mar the images, but each one remains a wonder. I've viewed endless vistas of Russian winters; lush tropical jungles of Brazil; railroad stations in the mountains of northern Norway and glorious scenes of Paris in the spring. All of these and many more have come floating in on the 10-meter airwaves. Best of all, I'm often treated to pictures of the person on the other end of the circuit, along with their homes and families. It gives you a genuine "human" perspective that is difficult to enjoy with almost any other mode.

Twenty-meters is the traditional SSTV "homeland," but 10-meter slow scan may be one of our best-kept secrets. Load the software and tune to 28.680 MHz. You may be surprised at what you hear…and *see*.

Something Looks Familiar…

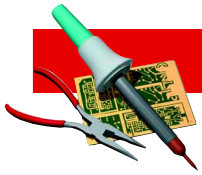
I can hear the HF digital readers saying, "Wait a minute! This article is describing an computer/radio interface for PSK31 [or RTTY, or MFSK16, or Hellschreiber…]!"

Bingo! You win the prize. SSTV with your computer sound card uses *exactly* the same interface employed for the HF digital modes. If you're already HF digital-active, all you need to run SSTV is the software. Download the program, install it and you've just added a new mode to your station repertoire.



I often use this snowy image (taken in front of my home) to begin the SSTV "conversation."

225 Main Street
Newington, CT 06111
sford@arrl.org



By H. Ward Silver, N0AX

Test Your Knowledge!

Time for a journey to the bygone years. How many of these companies and radios do you remember?

1. The original *Callbook* featured a flying…
   a. pig c. horse
   b. tiger d. eagle

2. Leo Myers was the proprietor of _____ Radio Labs.

3. Match the electronic "jobber" with the city:
   a. Burstein-Applebee e. New York City
   b. Lafayette Electronics f. Kansas City
   c. Butler Radio g. Chicago
   d. Cortland Radio h. Los Angeles

4. Who manufactured "Squawkboxes"?

5. Which company made the Super-Pro receiver: Hammarlund or Hallicrafters?

6. While Mosley Electronics is known today for antennas, one of its first products was a…
   a. receiver c. keyer
   b. transmitter d. amplifier

7. Radio Row in New York City was on what street?

8. The "Trans-Oceanic" was a product of what company?

9. Brown Brothers Manufacturing produced which sought-after product?
   a. headphones c. microphone
   b. keying paddle d. SWR meter

10. The E.F. Johnson amplifier based on the 4-1000 tube was given the name…
    a. Ultra c. Bandsweeper
    b. Thunderbolt d. Annihilator

11. What was the name for vacuum tubes in RCA's classic design manual?
    a. radiotrons c. nuvistors
    b. valves d. quasars

12. Which did the Drake Company manufacture: the C-line or the S-line?

13. The most widely-modified surplus transmitter after World War II was the ARC-….
    a. 3 c. 9
    b. 5 d 11

14. Match the product names and types:
    a. MICRO-TO f. receiver
    b. Navigator g. transmitter
    c. Cherokee h. amplifier
    d. 75A4 i. transmitter
    e. Warrior j. keyer

15. The "Ranger" was a transmitter. What word added in front of "Ranger" would change it into a popular receiver?

Bonus: Where were Heathkits built?

Total Your Score!
Count one point for each correct answer.

16-24	A professor of vintage radio!
8-15	In need of more reading, but not bad.
1-7	You have a limp grasp of ham history.

22916 107th Ave SW
Vashon, WA 98070

Answers

1. c—The "Flying Horse" *Callbooks* were published in the years following WWII.
2. World Radio Labs was famous for the Globe series of transmitters.
3. a-f/b-g/c-h/d-e
4. Gonset manufactured the inexpensive VHF transceivers, not to be confused with the Heathkit "Lunchboxes."
5. Hammarlund
6. a—the CM-1 was popular in the Midwest in the early sixties.
7. Cortland
8. Zenith—the product line was one of the most popular broadcast and SW receivers ever made.
9. b—These attractive paddles (and keys) featured chrome hardware, distinctive red paddles and knobs, and a crinkle-finish black base.
10. b—Even a version contained in a desk was made.
11. a—The Radiotron Design Manual was the bible of the electronics designer.
12. The R.L. Drake Company manufactured the C-line station gear. Collins made the S-line.
13. b—The ARC-5s were cheap, abundant, and easily modified to work on 40-meters.
14. a-j/b-g/c-i/d-f/e-h
15. Adding "Sky" would create the "Sky Ranger," a popular receiver made by Hallicrafters.
Bonus: At home, of course! The famous kit manufacturer was located in Benton Harbor, Michigan.

QUIKLOOP A LOOP-ARRAY MODELING AID

◊ For hams who love the lure of antenna designs, *EZNEC* by Roy Lewallen, W7EL, is a dream come true. I had in mind building a 2-meter loop array with circular elements and rather than guess, I wanted to design it on paper first. Fortunately, my loving daughter, Carolyn, saw *EZNEC* on my Christmas list one year, and there it was, under the tree.

Typical antenna-design programs require that we define the antenna as a series of straight segments, the ends of which must be identified by Cartesian (*X*, *Y*, *Z*) coordinates. Once you have these segment-end coordinates, they can be typed into the analysis program, and you can begin the analysis. For example, in a loop array with vertically oriented elements, *EZNEC* can use *X* for depth (toward the horizon—element spacing in this case); *Y* is the horizontal distance left or right from the centerline of the array; and *Z* is height.

Earlier experience with *MININEC* meant I wasn't a complete stranger to this process. For a simple dipole or long wire, it is a rather simple and quick description process. Thinking of a loop array in three dimensions—particularly one with circular elements—boggled my mind. Further, if I wanted to change or make a new antenna, I had to calculate and manually enter *all* those locations again. My design uses octagons to simulate circular loops—eight wires per element, three elements, three numbers for each point and two ends for each wire. That totals 144 numbers—and one mistake in manual calculation or data entry makes my work garbage!

An Easier Way

I learned from Roy that *EZNEC* can read a data file containing the information! So, into geometry, trigonometry and program writing I went. The result is *Quikloop*, an MSDOS (or DOS window) program.[1] *Quikloop* calculates each wire's endpoints for square, diamond or octagon (to approximate circles) element shapes in loop arrays and places the data in a file *EZNEC* can import. It can save you many hours of calculations and keyboarding.

It is convenient to load and run the program in the same directory where *EZNEC* looks for its antenna-description files. Once started, the program asks for the information that defines a loop array, in this sequence:

1. Number of elements.
2. Element circumference (in inches, for each element).
3. Element spacing from element 1 (in inches, for each element). For a three-element loop Yagi, element one is usually the reflector, element two is the driven element and element three is the director.
4. The element shape: square, diamond or circular (octagon).
5. Conductor diameter (the program assumes all elements have the same diameter, but you can change any element diameter once the data is in *EZNEC*).
6. A filename of your choice, but include no file extension. *Quikloop* automatically adds an "EZA" extension that distinguishes *Quikloop* files from other *EZNEC* files. If a file with the same name exists, it will be overwritten.

Quikloop asks for dimensions in inches and feet, but the wire-end locations are converted to meters, the default dimension for uploading into *EZNEC*. After you import the data into *EZNEC*, you can change to whatever units you prefer.

[1]You can download this package from the ARRL Web site at www.arrl.org/files/qst-binaries/. Look for QUIKLOOP.ZIP. If you want *QUIKLOOP* on a 3.5-inch PC-format floppy, send your name and address and a check payable to Robert Patzlaff for $5 to W9JQT, 422 W Maple St, Hinsdale, IL 60521.

Table 1
A Square-Loop Yagi with Three 0.25-inch-diameter Elements

Element Number	*Function (inches)*	*Circumference (inches)*	*Distance from Element 1*
1	Reflector	86.84	0
2	Driven Element	82.78	20.5
3	Director	78.57	32

Contents of the resulting file "MYLOOP.EZA"

```
0 ,–.275717 , 5.820283 , 0 ,–.275717 , 6.371717 , .00635
0 ,–.275717 , 6.371717 , 0 , .275717 , 6.371717 , .00635
0 , .275717 , 6.371717 , 0 , .275717 , 5.820283 , .00635
0 , .275717 , 5.820283 , 0 ,–.275717 , 5.820283 , .00635
.5207 ,–.2628265 , 5.833174 , .5207 ,–.2628265 , 6.358827 , .00635
.5207 ,–.2628265 , 6.358827 , .5207 , .2628265 , 6.358827 , .00635
.5207 , .2628265 , 6.358827 , .5207 , .2628265 , 5.833174 , .00635
.5207 , .2628265 , 5.833174 , .5207 ,–.2628265 , 5.833174 , .00635
.8128 ,–.2494598 , 5.84654 , .8128 ,–.2494598 , 6.34546 , .00635
.8128 ,–.2494598 , 6.34546 , .8128 , .2494598 , 6.34546 , .00635
.8128 , .2494598 , 6.34546 , .8128 , .2494598 , 5.84654 , .00635
.8128 , .2494598 , 5.84654 , .8128 ,–.2494598 , 5.84654 , .00635
```

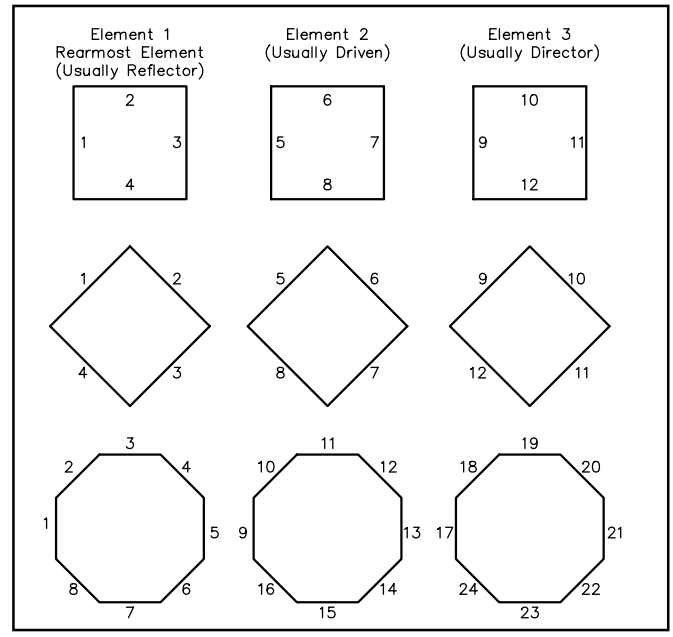


Figure 1—Wire numbering in antennas defined by *QuickLoop*. Numbering continues in similar fashion for additional elements. Use this diagram to determine the appropriate wire for source location in *EZNEC*.

Bob Schetgen, KU7G ♦ Senior Assistant Technical Editor

Getting the Data into EZNEC

Let's say you have just run *Quikloop* for a three-element loop Yagi described in Table 1 and named the output file "MYLOOP." To get the data from "MYLOOP.EZA" into *EZNEC* follow these steps:

1. Start *EZNEC*.
2. Go to the Wires menu.
3. Type "I" to import wires data.
4. Choose the file "MYLOOP.EZA" from those shown.
5. When asked, hit "R" to replace any existing wires data.

You will see that the coordinates from MYLOOP.EZA (also shown in Table 1) have been imported, and you are ready to analyze the antenna. At this point, you may want to change *EZNEC's* dimensions to those that are familiar to you.

If analysis shows that the element circumferences are too short or too long, you can easily generate a new EZA file and import the new data. This process is much easier than manually recalculating all those wire endpoints.

Quikloop makes loop-array analysis as easy as that for any other wire antennas. I find analyzing loop antenna arrays is now fun, and I like using circular elements at VHF and UHF. The geometry used in *Quikloop* defines vertically oriented elements in a loop array. Figure 1 shows the wire numbering plan used so you can pick your source wire location.

You can model other complex antennas by doing the geometry once and making a simple file to calculate the wire end coordinates. The *EZNEC* manual gives you criterion for the data file.—*Robert Patzlaff, W9JQT, 422 W Maple St, Hinsdale, IL 60521-3229;* **bobpatz@mediaone.net**

[W9JQT's great discovery is that we can import properly formatted text files into *EZNEC*. This means that we can model any antenna by using a spreadsheet or custom program to calculate segment endpoints and produce a file that *EZNEC* can import. QUIKLOOP .ZIP includes an example *Excel* spreadsheet (DeltaLoop.xls) that I created for a three-element array and *EZNEC* 3.0. W9JQT's instructions apply to *DOS*-based *EZNEC* versions; *EZNEC* 3.0 is written for *Windows* and has a File menu command to import Wires data from a file.—*Ed.*]

AN IMPROVED CONNECTION TO RG-6 CATV COAX

◊ During the construction of a G5RV, I found an interesting method of connecting some RG6 CATV coax to a PL-259. Most connection approaches remove the messenger, taper the jacket a little and twist the PL-259 on—letting friction make the electrical connection to the braid. Many hams can attest that trying to solder to the braid on this stuff is thwarted by the aluminum and the antioxidant. When I did that, my connections would work loose about every 10 days. Sitting at my bench looking at a PL-259 and seeing a box of taps, I decided to try a mechanical approach. Here's how:

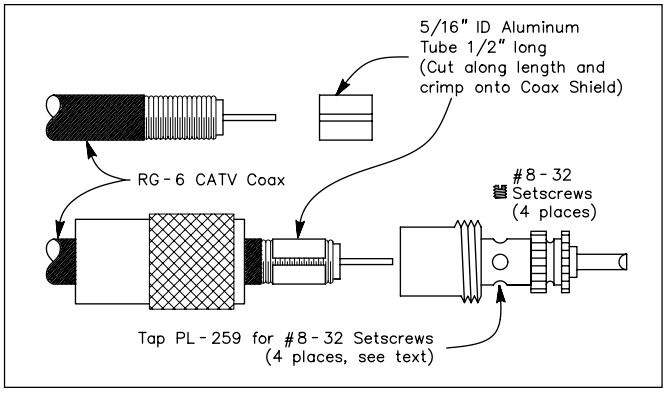


Fig 2—Details of AF4JX's mechanical connection of a PL-259 to RG-6 CATV coax, that has aluminum braid and foil shield.

It turns out that a #8-32 tap will nicely tap the braid solder holes of a PL-259. Tap all four holes. If you're careful, you can tap the hole on the opposite side by continuing the tap through, but you must be lined up square on the first hole.

Next, make four very short setscrews. Use a hobby grinder with a thin cutoff wheel to cut a screwdriver slot in the end of a #8-32 screw, then cut off the slotted piece so that it's about 3 or 4 threads long. (The screws must be short to clear the connector sleeve.)

If tightened directly onto the shield, the screws dig into the insulation around the center conductor. They need something to distribute their pressure. I found some thin, seamed aluminum spacers, opened them slightly and slipped them over the braid. (Slit $^{5}/_{16}$-inch ID aluminum tubing or rolled aluminum flashing should work too. Use anti-corrosion compound at all of the aluminum joints—*Ed.*) I used a crimping tool with a spark-plug die to set the spacer on the shield. Slip the coax into the connector, solder the center conductor and tighten the screws. So far, my connection is doing well after four months, and it's easy to disassemble.—*Joe Semer, AF4JX 324, Academy St, Johnston, SC 29832;* **joesemer@pbtcomm.net**

INSULATION HOLDS PROBES ON WIRES

◊ Performing a continuity check on newly constructed multiconductor cables and connectors can be most frustrating if no assistant is available. When confronted with these circumstances recently, I happened to notice a piece of insulation that had been stripped from some #14 AWG wire. I cut two $^{3}/_{4}$-inch lengths of the insulation and forced all but $^{1}/_{16}$-inch over each of my ohmmeter probe tips. The tubing is a great way to steady the probes on the tapered pins of the connectors. This simplified an otherwise difficult job.—*Charles Turner, KI7NW, 315 Center Ave, Bisbee, AZ 85603;* **cagt@theriver.com**

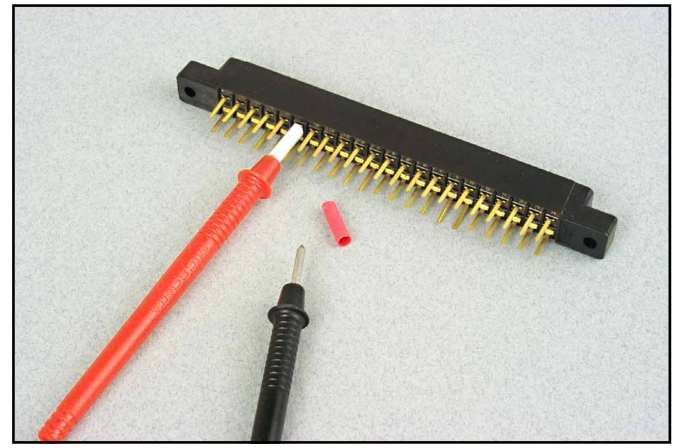


Fig 3—KI7NW slips some insulation over his probe tips to keep them on test points and prevent short circuits. This photo shows pieces of heat-shrink tubing used for the same purpose. Select the insulation diameter so that it holds the probe and test lead firmly together.

Hints and Kinks items have not been tested by *QST* or the ARRL unless otherwise stated. Although we can't guarantee that a given hint will work for your situation, we make every effort to screen out harmful information. Send technical questions directly to the hint's author.

QST invites you to share your hints with fellow hams. Send them to "Attn: Hints and Kinks" at ARRL Headquarters (see page 10), or via e-mail to **rschetgen@arrl.org**. Please include your name, call sign, complete mailing address, daytime telephone number and e-mail address on all correspondence. Whether praising or criticizing an item, please send the author(s) a copy of your comments. QST

Yaesu FT-817 Multiband Multimode Transceiver

Reviewed by Rick Lindquist, N1RL
ARRL Senior News Editor

For today's on-the-run population, the multiband, multimode FT-817 means that you can take along much more ham radio than that FM-only H-T you've been tossing into your bag up until now. In a short time, this (so far) one-of-a-kind transceiver has proven to be one of those "killer" Amateur Radio products that come along every so often and capture our imaginations with their unique universe of operating possibilities.

Because this is a low-power radio (5 W), its introduction at hamfests as early as last summer attracted particular attention from the QRP crowd. But, let's be clear about something up front: The FT-817 is a low-power radio that *everyone* can enjoy, and it was not developed with the QRPer specifically in mind. This carry-along transceiver only happens to be low-power because it needs to be, especially when you're running it off internal batteries.

With all-mode transmit and receive capability on all bands between 160 and 2 meters plus 70 cm plus wide LF, MF, HF, FM broadcast, and VHF-UHF receiver coverage in a package that almost but not quite fits in the average jacket pocket, additional output power might possibly be the *only* other feature you could possibly desire, but it's one we found we didn't miss either.

A Unique Radio

In case you're wondering about the nomenclature, Yaesu seems to be subtly suggesting that this little transceiver shares some DNA with the company's FT-847 multiband, multimode HF+VHF+UHF+satellite transceiver. Indeed, both rigs cover essentially the same bands. The '817 is not capable of full duplex satellite operation, however.

In terms of form factor, the FT-817 is reminiscent of the early "sack pack" radios that were popular in the 1970s—the Kenwood TR-2200A and the closely related Drake TR-33 come quickly to mind, as well as the ICOM IC-502. In their day, these radios bridged the gap between the somewhat clunky H-Ts and a full-blown FM mobile. Later hand-held transceivers overtook that trend, but by and large, the H-T style never adequately made the transition to HF transceiver design. One exception is the still-popular but hard-to-find Tokyo Hy-Power HT-750. This was perhaps the sole successful attempt to meld a usable transceiver with HF capability into an H-T package. While the HT-750 offered 2 W or so, SSB and CW, on 40, 15 and 6 meters and includes a real superhet receiver, it never took off and no longer is marketed in this country. Perhaps it was simply ahead of its time.

I Just Gotta Have Me One of These!

Think back a few short years, and consider those products that generated the biggest "buzz" on the bands (today we'd say "on the 'net"). Remember in 1993 when Kenwood awed the amateur community by introducing the first compact 100 W HF transceiver, the TS-50S? For those of us weaned on Hallicrafters and Johnson gargantua, this was a huge leap in the direction of Dick Tracy's mythical two-way wrist radio.

The race for small was on! While Kenwood seems to have dropped out for reasons best known to itself, Alinco, ICOM, and finally Yaesu came out with ever-more compact transceivers, upping the ante with additional capabilities and features with each succeeding unit.

With the FT-817 you get an economically priced transceiver you can carry, instead of lugging around, just about anywhere—not quite an H-T in form, yet much more than an H-T in function. And that's the whole idea. The FT-817 offers a lot of features you're already familiar with from your H-T as well as those you enjoy on a typical HF transceiver. It's kind of an H-T *plus*, and that's spelled with a "p" for *portable*!

Bottom Line

What a great little radio, and what a great little price! This carry-along does it all. You *can* take it with you after all! As one user declared: "It's a keeper!"

Cost vs Capability

When it comes to ham radio gear, we like to say that you get what you pay for. Viewed in those terms, the FT-817 might just be one of the best values in the Amateur Radio marketplace today.

The FT-817 wears a lot of hats. It's a CW, SSB, or digital mode rig for HF, VHF and UHF; it's a FM rig for repeater work (a multi-section H-T style rubber ducky antenna for the VHF and UHF bands is included); and it's an on-the-road listening post—LF, AM broadcast, FM broadcast, HF amateur and shortwave, AM aircraft, and more.

As any HF transceiver worth its salt does, the FT-817 offers VOX for SSB (sorry, no speech processor, however) and a built-in keyer for CW. There are separate VOX delay settings for SSB and CW—some larger rigs don't even have this feature, but should. It has both an RIT and an IF shift, plus you can add one optional filter for either SSB or for CW in the 455 kHz IF. For digital work, it includes provisions to discretely adjust the audio input (ie, from your sound card or TNC) for digital modes. There's a noise blanker that really works. Great!

Joe Bottiglieri, AA1GW ♦ Assistant Technical Editor

Table 1
Yaesu FT-817, serial number 0M050276

Manufacturer's Claimed Specifications	Measured in the ARRL Lab
Frequency coverage: Receive, 0.1-30, 50-54, 76-108 (WFM), 144-148, 420-450 MHz; transmit, 1.8-2, 3.5-4, 5.168[1], 7-7.3, 10.1-10.15, 14-14.35, 18.068-18.168, 21-21.45, 24.89-24.99, 28-29.7, 50-54, 144-148, 430-450 MHz.	Receive, 0.1-56[2], 76-108 (WFM), 108-154, 420-450 MHz; transmit, as specified.
Power requirement: Receive, 0.45 A; transmit, 2.0 A (5 W output). 8.0-16.0 V dc (13.8 nominal)	Receive, 0.37 A; transmit, 1.9 A. Tested at 13.8 V.
Modes of operation: SSB, CW, AM, FM, AFSK.	As specified.

Receiver

	Receiver Dynamic Range
SSB/CW sensitivity, bandwidth not specified, 10 dB S/N[3]: 1.8-30 MHz, <0.25 µV; 50-54 MHz, <0.2 µV; 144-148, 430-450 MHz, <0.13 µV.	Noise floor (MDS), 500 Hz filter:

	Preamp off	*Preamp on*
1.0 MHz	–117 dBm	–127 dBm
3.5 MHz	–123 dBm	–133 dBm
14 MHz	–126 dBm	–134 dBm
50 MHz	–129 dBm	–140 dBm
144 MHz	see note 4	–139 dBm
432 MHz	see note 4	–140 dBm

AM sensitivity, 10 dB S/N[3]: 0.3-1.8 MHz, <32 µV; 1.8-30 MHz, <2 µV; 50-54 MHz, <2 µV; 144-148, 430-450 MHz, Not specified.

10 dB (S+N)/N, 1-kHz tone, 30% modulation:

	Preamp off	*Preamp on*
1.0 MHz	7.5 µV	2.45 µV
3.8 MHz	3.3 µV	1.2 µV
50 MHz	1.68 µV	0.52 µV
120 MHz	see note 4	0.67 µV
144 MHz	see note 4	0.62 µV
432 MHz	see note 4	0.63 µV

FM sensitivity, 12 dB SINAD[3]: 28-30 MHz, <0.5 µV; 50-54, <0.32 µV; 144-148, 430-450 MHz, <0.2 µV.

For 12 dB SINAD:

	Preamp off	*Preamp on*
29 MHz	0.77 µV	0.28 µV
52 MHz	0.45 µV	0.16 µV
146 MHz	see note 4	0.18 µV
440 MHz	see note 4	0.20 µV

Blocking dynamic range: Not specified.

Blocking dynamic range, 500 Hz filter:

	Preamp off	*Preamp on*
3.5 MHz	107 dB	106 dB
14 MHz	106 dB	104 dB
50 MHz	110 dB	107 dB
144 MHz	see note 4	108 dB
432 MHz	see note 4	106 dB*

Two-tone, third-order IMD dynamic range: Not specified.

Two-tone, third-order IMD dynamic range, 500 Hz filter:

	Preamp off	*Preamp on*
3.5 MHz	86 dB	86 dB
14 MHz	87 dB	84 dB
50 MHz	89 dB	87 dB
144 MHz	see note 4	88 dB*
432 MHz	see note 4	82 dB*

Third-order intercept: Not specified.

	Preamp off	*Preamp on*
3.5 MHz	+8.2 dBm	–3.1 dBm
14 MHz	+5.0 dBm	–5.6 dBm
50 MHz	+0.8 dBm	–12 dBm
144 MHz	see note 4	–11 dBm
432 MHz	see note 4	–12 dBm

Second-order intercept: Not specified.

Preamp off, +84.0 dBm; preamp on, +88.4 dBm.

FM adjacent channel rejection: Not specified.

20 kHz channel spacing, preamp on: 29 MHz, 66 dB; 52 MHz, 65 dB; 146 MHz, 64 dB; 440 MHz, 65 dB.

An expanded test result report is available to our members on our Web site. Printed copies are also available to those without Web access.

The FT-817 has incorporated all the useful features you've come to know and love on your FM-only rig, too. There are automatic repeater shift menu settings for 2 and 70 cm (although apparently not one for 6 meters); up to 200 memories (that can be partitioned into 10 groups each holding up to 20 memory channels); alphanumeric memory labeling; scanning capability, including programmed memory scan and dual watch (a priority-channel monitor); a time-out timer; and 1200 and 9600-bps packet.

Other niceties include features you might not have on your "big rig" such as AM mode on transmit, should you be so inclined; a spectrum scope; *Smart Search* (in AM or FM mode, the '817 can search and store active frequencies in a special bank of 50 memory channels); Yaesu's exclusive *Auto Range Transpond System*; the ability to set power levels independently for the HF+50 MHz, 144 MHz and 430 MHz bands; scratchpad "QMB" (quick memory bank) memory channel plus four one-touch "Home" channels, in addition to regular memories; and 5167.5 kHz Alaska Emergency Frequency capability.

With all these features you'd figure Yaesu must have cut corners in the design and engineering to keep the price down below $800. Well, perhaps here and there, but as the ARRL Lab data in Table 1 demonstrate, the FT-817 is a decent performer across the board, exhibit-

FM two-tone, third-order IMD dynamic range: Not specified.	20 kHz channel spacing, preamp on: 29 MHz, 67 dB; 52 MHz, 68 dB*; 146 MHz, 66 dB*; 440 MHz, 66 dB; 10 MHz channel spacing, preamp on: 52 MHz, 109 dB; 146 MHz, 94 dB; 440 MHz, 81 dB.
S-meter sensitivity: Not specified.	S9 signal at 14.2 MHz: preamp off, 54 μV; preamp on, 16 μV; 52 MHz, preamp off, 49 μV; preamp on, 6.7 μV; 146 MHz, 5.9 μV; 432 MHz, 4.7 μV.
Squelch sensitivity: SSB, 1.8-30 MHz, <2.5 μV; 50-54 MHz, <1 μV; 144-148, 420-450 MHz, <0.5 μV; FM, 28-30 MHz, <0.32 μV; 50-54 MHz, <0.2 μV; 144-148, 430-450 MHz, <0.16 μV.	At threshold, preamp on: SSB, 14 MHz, 1.62 μV; FM, 29 MHz, 0.14 μV; 52 MHz, 0.10 μV; 146 MHz, 0.09 μV; 440 MHz, 0.07 μV.
Receiver audio output: 1.0 W at 10% THD into 8 Ω.	1.1 W at 10% THD into 8 Ω.
IF/audio response: Not specified.	Range at –6 dB points, (bandwidth): CW-N (500 Hz filter): 404-1100 Hz (696 Hz); CW-W: 329-2689 Hz (2360 Hz); USB-W: 276-2759 Hz (2483 Hz); LSB-W: 224-2676 Hz (2452 Hz); AM: 108-4030 Hz (3922 Hz).
IF rejection: 60 dB; image rejection: 1.8-30 MHz, 50-54 MHz, 70 dB; 144-148, 430-450 MHz, 60 dB.	First IF rejection, 14 MHz, 92 dB; 50 MHz, 91 dB; 144 MHz, 104 dB; 432 MHz, 127 dB; image rejection, 14 MHz, 66 dB; 50 MHz, 99 dB; 144 MHz, 119 dB; 432 MHz, 79 dB.

Transmitter

Transmitter Dynamic Range

Power output: SSB, CW, FM, 5 W (high); AM, 1.5 W carrier (high).	CW, SSB, FM, typically 5 W high, 0.5 W low; AM, typically 1.5 W carrier high, <0.5 W low.
Spurious-signal and harmonic suppression: ≥50 dB on HF; ≥60 dB on VHF & UHF.	HF, 50 dB; 50 MHz, 58 dB; 144 MHz, 63 dB; 430 MHz, 55 dB. Meets FCC requirements for spectral purity.
SSB carrier suppression: ≥40 dB.	As specified. >50 dB.
Undesired sideband suppression: ≥50 dB.	As specified. >60 dB.
Third-order intermodulation distortion (IMD) products: Not specified.	See Figures 1 and 2.
CW keyer speed range: Not specified.	4 to 57 WPM.
CW keying characteristics: Not specified.	See Figure 3.
Transmit-receive turn-around time (PTT release to 50% audio output): Not specified.	S9 signal, 32 ms.
Receive-transmit turn-around time (tx delay): Not specified.	SSB, 16 ms; FM, 15 ms. Unit is suitable for use on AMTOR.
Composite transmitted noise: Not specified.	See Figures 4 and 5.
Bit-error rate (BER), 9600-baud: Not specified.	146 MHz: Receiver: BER at 12-dB SINAD, 1.7×10^{-3}; BER at 16 dB SINAD, 7.6×10^{-5}; BER at –50 dBm, $<1.0\times10^{-5}$; transmitter: BER at 12-dB SINAD, 7.7×10^{-4}; BER at 12-dB SINAD + 30 dB, $<1.0\times10^{-5}$. 440 MHz: Receiver: BER at 12-dB SINAD, 1.3×10^{-3}; BER at 16 dB SINAD, 7.2×10^{-5}; BER at –50 dBm, $<1.0\times10^{-5}$; transmitter: BER at 12-dB SINAD, 7.5×10^{-4}; BER at 12-dB SINAD + 30 dB, $<1.0\times10^{-5}$.

Size (HWD): 1.5×5.3×6.5 inches; weight, 2.6 pounds.

Note: Unless otherwise noted, all dynamic range measurements are taken at the ARRL Lab standard spacing of 20 kHz.

*Measurement was noise-limited at the value indicated.

Third-order intercept points were determined using S5 reference.

[1]Alaska emergency frequency (see Section 97.401[d] of the FCC Rules).

[2]Sensitivity reduced below 400 kHz.

[3]IPO off (preamp on).

[4]IPO not available above 70 MHz.

ing performance that is comparable to and even rivals some compact and even a few full-size transceivers out there.

A Low-Power Version of the FT-100?

A lot of first reactions to the FT-817 are along the lines of "Honey, Yaesu shrank the FT-100." It has a similar, but obviously smaller, look and feel, and, as with your H-T, you might have just a bit more trouble getting your fingers on the controls. Besides, there are fewer controls to start with, and some have multiple functions to conserve panel space, so learning to use the FT-817 is a bit more like learning your way around a new H-T.

The FT-817 is just a really cool radio for a lot of reasons, but the main one is that Yaesu had packed so much into the little package that it almost boggles the mind. The radio is not perfect, but the pluses outweigh the minuses. We'll touch on both along the way.

Most prominent on the front panel (aside from the rubber ducky, if you've got it mounted) is the **MAIN** tuning dial. Yaesu included a dimple, ostensibly for finger-spinning the knob. You might be able to spin this knob with the eraser end of a pencil, but given the diminutive size of the knob, any physical advantage is practically nonexistent. You're better off spinning it by holding your index finger against the outside rubber grip. For fast excursions, you'll want to use the multi-function **SEL** knob, a detented control that

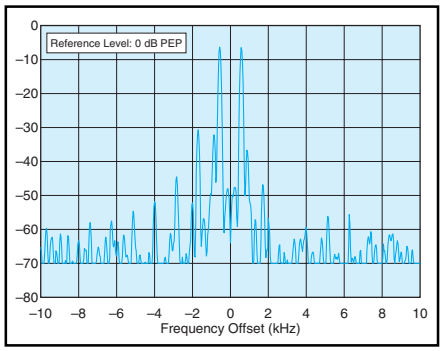


Figure 1—Worst-case HF spectral display of the FT-817 transmitter during two-tone intermodulation distortion (IMD) testing. The worst-case third-order product is approximately 32 dB below PEP output, and the worst-case fifth-order product is down approximately 46 dB. The transceiver was being operated at 5 W PEP output at 18.12 MHz.

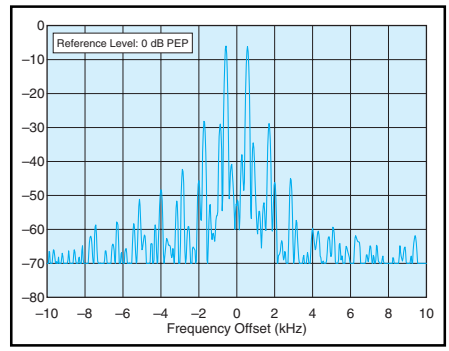


Figure 2—Worst-case VHF/UHF spectral display of the FT-817 transmitter during two-tone intermodulation distortion (IMD) testing. The worst-case third-order product is approximately 30 dB below PEP output, and the worst-case fifth-order product is down approximately 44 dB. The transceiver was being operated at 5 W PEP output at 144.2 MHz.

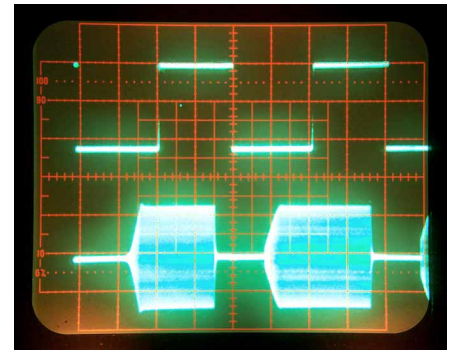


Figure 3—CW keying waveform for the FT-817 showing the first two dits using external keying. Equivalent keying speed is 60 WPM. The upper trace is the actual key closure; the lower trace is the RF envelope. The transceiver was being operated at 5 W output at 14.2 MHz.

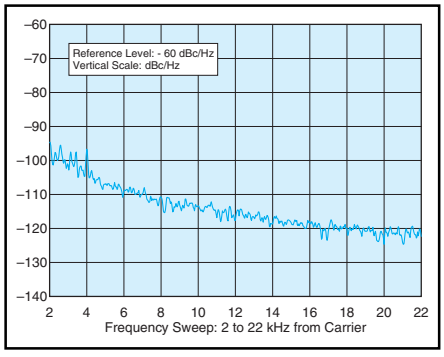


Figure 4—Worst-case HF spectral display of the FT-817 transmitter output during composite-noise testing. Power output is 5 W at 3.52 MHz. The carrier, off the left edge of the plot, is not shown. This plot shows composite transmitted noise 2 to 22 kHz from the carrier.

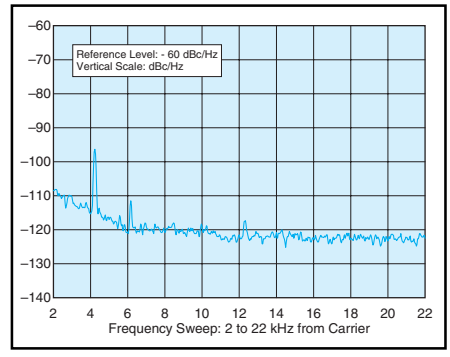


Figure 5—Worst-case VHF/UHF spectral display of the FT-817 transmitter output during composite-noise testing. Power output is 5 W at 432.02 MHz. The carrier, off the left edge of the plot, is not shown. This plot shows composite transmitted noise 2 to 22 kHz from the carrier.

serves for fast tuning (press it in, and you can jump one MHz at a time), as well as for function-key and memory selection and—if that weren't enough—for RIT and for IF shift and a couple of other minor functions. As a result, the **SEL** control can be a bit befuddling. You'll want the *Operating Manual* for this one.

The FT-817's little rectangular display (it's about $1^{5}/_{16} \times {}^{5}/_{8}$ inches) includes a lot of operating information, some of which—unless you've got great vision—might not be visible to the naked eye. H-T users already are familiar with this phenomenon. The important stuff like the frequency, the operating mode and the meter display all is easy-to-see—the default numbers are about $^{1}/_{8}$-inch tall—but you might have trouble deciphering bottom-tier data, which are about half as large and include such things as whether the CTCSS encoder or decoder is enabled, the repeater shift direction, and the transmitter power level. For the analog-challenged, the FT-817 offers a digital S meter readout—no more guessing about meter peaks!

A function key setting lets you switch the display between small and large (double-size) character modes, at the expense of information at the top of the display, like VFO or memory-channel and mode setting. It's also possible to substitute the current battery voltage for the VFO or memory channel readout.

A menu setting lets you choose between two backlight colors, blue or amber. The amber's great, but the black display characters on the blue background are not as readable. Other menu settings let you set contrast level and whether you want the display illuminated all the time, off entirely, or only for five seconds after each button press in order to save energy.

There are more pushbuttons than knobs on the FT-817 front panel, plus a few more on the top right over the display. The only other ones beside the **MAIN** and **SEL** knobs are the concentric **AF** and **SQL/RF** controls. Again, with this sort of interface, we're squarely in H-T territory. The BNC antenna connector on the lefthand side of the front panel completes the picture.

Of the buttons you'll get to know well, the **F** key and the three **FUNC** keys (**A**, **B**, and **C**) along the bottom of the display window, are the ones you'll use the most. The inclusion of software-defined multifunction keys is a design trend found on more than one amateur transceiver these days. The FT-100 uses it.

Used in conjunction with the **F** button—which is just above and slightly to the left of the **MAIN** tuning knob, the three **FUNC** keys provide access the most important transceiver functions—things like noise blanker, filter selection, VFO selection, memories, receiver preamplifier, VOX, search and scan, and CW keyer. In all, there are a dozen rows of functions, 33 individual items in all. *Lots* of choices! You use the multifunction **SEL** knob to select the various rows of functions.

In theory, this concept works great. In practical terms on the FT-817, it works pretty well most of the time, and you'll need some practice to get good at it. A major stumbling block to smooth operation of the **F/FUNC** keys system includes the fact that the **F** button is recessed just enough to make it a bit dicey for some operators to easily press it momentarily, as required to enable the **FUNC** keys, without pushing the radio off the table or bumping the tuning knob at the same time. Another problem is that once you press a particular **FUNC** key, its label disappears, although it (usually) will continue to enable the particular function you'd selected. It requires another press of the **F** key to return the labels, although some labels return momentarily if you press a **FUNC** key.

Other front-panel buttons let you power the radio on or off, lock the tuning, swap between memory and VFO, enable the RIT (clarifier) and the IF shift and access the bank of **HOME** memory channels. The LED lights green on (unsquelched) receive and red when you transmit.

The two **MODE** buttons and **DWN** and

UP BAND buttons are right over the display on the speaker side of the case. These can be easy to mix up at first. One more control, the **SP-PH** switch, is on the side of the radio next to the **SP/PH** jack. This lets you switch between an external speaker or headphones. The *Operating Manual* doesn't say so, but the **SP/PH** jack accepts a $^1/_8$-inch stereo plug, so you can use a set of off-the-shelf headphones. The RJ-45 modular-type **MIC** jack also is on the side panel.

The most prominent feature on the rear panel is the SO-239 antenna jack. By default, the BNC connector on the front is for VHF and UHF, while the SO-239 on the back is for HF and 50 MHz, but these can be reassigned through a menu setting. There are also the key jack, the mini-DIN style **DATA** and **ACC** connectors, a **GND** (ground) screw, and—ooops, we almost forgot—the coaxial-style power jack. Yes, you can run the FT-817 from an external power source of up to 13.8 V dc. We'd recommend this if you're planning to do any extended operating.

The supplied MH-31 dynamic microphone almost seems to dwarf the radio it's attached to and adds substantial heft to the total package weight. In addition to the **DWN/FST/UP** buttons, the mike has a two-position **TONE** switch on the rear side to equalize the audio for differing voices. A DTMF keypad is not provided.

Would You Like Fries With That, Mr Heinz?

In addition to activating the soft-key functions, the **F** key—when you press and hold it—opens the door to up to 57 (get it?) individual menu items that you can configure to personalize your FT-817 to suit your operational preferences.

There's a cornucopia of configurable settings here, ranging from the commonplace (CTCSS tone—50 available, keyer speed setting, mike gain settings, display color and contrast, and VOX gain and delay) to the less-frequented (CW weight, paddle sense, tuning steps on various modes, antenna port selection, packet rates, and time-out time) and the downright esoteric (DCS normal or inverted coding and "extended" menu items that let you set the carrier point for LSB and USB in both transmit and receive—when was the last time a transceiver offered you those choices?).

On the Road or in the Shack

With an internal battery installed, the FT-817 is instant ham radio—just add antenna. Of course, VHF and UHF rubber ducky antennas are provided for local repeater and simplex use, although it's sometimes easy to lose sight of the fact that you need at least a modestly efficient and effective antenna to get results on HF. (As an aside: the Tokyo Hy-Power H-T included a collapsible loaded whip antenna for HF that actually worked, although you always wondered what laws of physics had been displaced to make it happen.)

At the 5 W setting (or even at 2.5 W, 1 W or 0.5 W—there are four power levels available), you can work a good deal—even DX—and this power level was just fine for VHF and UHF repeater work with the duck antenna.

On a visit to my brother's, I took the FT-817 along. He runs what's often called "vintage" tube-type gear, and I wanted to wow him with something new and small that hears at least as well as his rig but doesn't drift. Just to see what would happen, I plugged the feedline of his multiband dipole into the SO-239 without benefit of an antenna tuner and fired up the radio on 40-meter SSB using the internal batteries. There was a fair amount of SWR, but even with a couple of watts I soon found myself engaged in QSO with three stations in different states. Audio reports were uniformly favorable. It was literally plug and play! How easy is that?

In terms of operating, the FT-817 has more bells and whistles for CW than it does for SSB or FM. The internal keyer, for example, was a joy, although having to go to the menu to change the speed is less than convenient. You can press and hold the **KEYR** function key to access the speed menu, but you still need to then press and hold the **F** key to save the setting. The speed menu can show WPM or CPM for CW speed. By the way, in another menu window, you can alter the dot-dash ratio if you desire, for heavier or lighter keying. The only thing lacking was a CW memory or two.

While the FT-817 was not designed to be full-break-in (QSK), you can emulate full-break-in performance by setting the CW delay to its lowest value, 10 ms. The tradeoff here is that at a delay setting much below 50 ms, the relay will follow the keying, and you'll then have to listen to the relay clacking away like some railroad telegraph in days of yore.

The CW sidetone volume is adjustable via the menu. Pressing the **HOME** key gives you the proper note to zero beat a station you're listening to—a nice touch. The CW pitch is adjustable between 300 and 1000 Hz.

An absolutely must-have accessory for CW is the optional YF-122C 500-Hz Collins mechanical filter. Many new FT-817 owners (ourselves included) lamented that this filter was not available at the time these radios began showing up on the market. That's because the stock ceramic filter does not offer single-signal reception on CW—you'll hear the note on both sides of zero beat (the same is true of ICOM's IC-706, by the way). When there's a lot of activity on the band, this renders the radio almost unusable on CW.

The YF-122C is a seven-pole affair that goes in the 455 kHz IF. It's hugely effective. Installation is simple yet tricky. Your instincts might be to install the filter upside-down, but it installs with the pins on the transceiver PC board coming up through what seems to be the wrong side of the connectors on each end of the filter board. A diagram in the manual shows the proper configuration. You must make sure the pins all are straight and even. Then it's just a matter of aligning the pins with the connector holes and pressing down gently but firmly on each end of the filter board. A 2.3 kHz SSB filter, the YF-122S, is also available.

For more demanding operating situations, users will find the **IF SHIFT** control a welcome companion. Enabling it requires tapping the **CLAR** button and using the multifunction **SEL** control. The best approach was to first enable the RIT function—even if you didn't plan to use it right away—then pressing and holding the **CLAR** button for a moment to enable the IF shift function. You can return to the RIT with a quick tap of the **CLAR** button. It sounds more inconvenient than it really is.

Don't try to use the **SEL** knob to adjust the **IF SHIFT** or **RIT** while transmitting. You'll find that control reverts to its coarse frequency setting function while in transmit mode.

We've got three words for you about FM operation: Push to talk. The FT-817 lets you set the FM mike gain (essentially the deviation) separately. And before you ask, yes, you can enable VOX (talk to talk?) for use on FM—something that might come in handy if you're using a headset with a boom mike.

For repeater operation, pressing the **RPT** function key sets up the shift; it also can be set independently for each band. When you have the RPT function key menu up, you also have access to the **REV** and **TON** keys.

I got great audio reports on FM too, although even at 2.5 W, the alkalines I'd loaded up didn't hold up very long during an afternoon on the local weather-spotter net during a snowstorm. One second I was transmitting, the next I was looking at a dark display and a silent radio, which had shut itself down without warning while I was in mid-transmission.

The FT-817 includes the ability to search for the CTCSS tone or DCS code being used by a repeater or another station, provided the other station or repeater "pass" the information. After pressing the **TCH** function key to activate the encoder/decoder, the unit will start scanning for incoming tones. When it detects the tone,

it will let audio pass. Pressing and holding the **TCH** key will store the detected tone as the current tone.

The **DATA** jack on the rear panel allows access to the connection points necessary to configure digital modes, such as RTTY or PSK31—an ideal mode for a radio at this power level—or packet. You can use the 500-Hz filter for RTTY or PSK31, by the way, and there are separate mode settings for packet digital work.

What's Cool!

Users like the fact that this was a very capable FT-100-like radio that you could hold in your hand and power off AA cells. "It puts the fun back into ham radio," one new owner enthused. "It's very well-make, rugged, has a good feel and nice features—it feels like a *real* radio, in other words" (well it *is*, of course).

Users found the receiver's solid (but unspectacular) performance another plus. Consider that, with the optional CW filter installed, the two-tone third-order IMD dynamic range is in the mid to upper 80s, and sensitivity more than adequate, especially with the preamp enabled (see Table 1). This is right in the ballpark with larger compact transceivers on the market such as the big brother FT-100 or the competing IC-706 and TS-50.

Users enjoyed the fact that they could dial up some music or news on the FM or AM band when not operating. Even the teeny built-in speaker turned out acceptable audio in those modes—at least as good as the typical portable radio.

You can send CW (although not very fast and only with practice) using the microphone **DWN/UP** buttons. One user said the implementation on the FT-817 was less usable than on the ICOM IC-706, the first radio we'd encountered that incorporated this quirky feature. The **DWN/UP** buttons are recessed and on the front of the mike, and actuating them takes some doing, but this feature might come in handy should you forget to pack a key.

Yaesu has provided the option of being able to control the FT-817 via a PC, using the CT-62 accessory cable, which contains a built-in level converter so it can be directly connected from the transceiver to the serial port on your computer. The manual contains the **CAT** system data protocol and commands. (As an aside, the FT-817 offers a "clone" function so that you can copy the memory contents from one '817 to another via a cable.)

Users also appreciated the fact that the *Operating Manual* was well-written and comprehensive—a Yaesu hallmark in our experience.

Perhaps best of all, users considered the FT-817 a great value, a marriage of the best the small HF or top-end QRP transceivers have to offer with the features of the most capable VHF/UHF FM hand-helds in an all-mode package.

What's Not

Users found the plastic battery cover especially difficult to remove. The spring catch is tight, and there's no spring to "pop" the cover up. You have to either have good fingernails or use a knife blade or screwdriver to pry it up—or turn the radio over and risk dropping batteries on the floor or ground. Some users griped that the battery holder springs lose their tension.

Several users commented on the noisy relay in CW, which can get downright annoying to some ops when in the almost-but-not-quite-full-break-in mode. One user we know described it as sounding like "a threshing machine."

The cast-aluminum "base" (actually the rear apron) is rather unstable when the radio is set down on its "bottom"—as you'd likely do while using the included carry strap.

The rubber ducky antennas come in three pieces, and some felt these might be easy to lose. You can store these in the strap handle, but the small tip piece is especially vulnerable to ending up in the lost and found.

Some users wanted the ability to easily unsnap the carry strap, which can get in the way once you set the radio down to operate, in which case they also missed a bail to boost the radio up toward the user while on a flat surface. (The shoulder strap is readily adjustable, however.)

The internal batteries will not power the radio very long. On receive, the radio draws 370 mA, according to the ARRL Lab (see Table 1).

Speaking of power, some users faulted Yaesu for not including a somewhat heavier-duty external power cable, although the one provided certainly is up to the task and doesn't add much to the total weight of the package. The manual specifically warns of the dire consequences of reversing the polarity—but there are no fuses in the power cord, and no recommendations in the manual to add them. If you have any doubts as to your abilities to keep these connections straight, fuse the cables!

Recently-shipped '817s include a snap-on ferrite choke for the power cord. Some early users had reported problems while connected to an external power source and transmitting on UHF with the rubber duck antenna. Earlier purchasers can contact Yaesu to make arrangements to get the choke.

Other minor whining: There's "audio" noise while it's squelched (FM mode), and turning down the volume control all the way does not totally kill the audio.

Frills

As noted, the FT-817 includes a *Spectrum Scope Monitor* that lets you "view" activity on what Yaesu calls "five channels" above and below the current operating frequency when in the VFO mode. What "five channels" translates to in terms of actual frequency range is not clear, but when tuned to 7.020 MHz, the radio still spotted a signal transmitted at 7.000 MHz. The height of the vertical bars displayed represents the relative signal strength of these adjacent-frequency signals. There are two modes—one sweeps repeatedly until the feature is turned off, the other sweeps one cycle every 10 seconds. In either mode, the receiver's audio is muted while it's sweeping, and the S meter is disabled.

Unlike similar implementations in other radios, the Spectrum Scope Monitor does not include a tunable pointer or cursor that lets you jump to a particular swept "signal" marker.

This potentially handy—and totally unexpected—feature is great to check for other nearby signals—say while waiting for a VHF or UHF band to open up during a contest—but its usefulness is limited by the inability to readily identify just where a spotted signal is, so you can tune to it.

Never at a Loss

Although it's a low-power radio, the FT-817 offers features galore—including some that most ops will never use—and we never felt the need for more power (there's a solution if you ever do—buy an FT-100). With a decent antenna on HF, the radio's 5 W more than held its own, and it was a comfort to know that the receiver would come through under all but the most demanding situations (don't try sidling up to one of the big guns in a contest with any radio like this).

It's a delightful transceiver package to take on the road or just enjoy closer to home, such as in the car, on the patio or while sitting on the river bank waiting for the big ones to start biting.

Thanks to Yaesu for ratcheting up Amateur Radio portability a few more notches and for showing us that less sometimes really can be more. This little radio will put smiles on a lot of faces. As one user so aptly put it: "The FT-817 puts the fun back into ham radio!"

Manufacturer: Yaesu USA, 17210 Edwards Rd, Cerritos, CA 90703; 562-404-2700; fax 562-404-1210; **www.yaesu.com**.

Manufacturer's suggested retail price: $950. Typical current street price: $750. List prices of selected optional accessories: YF-122S 2.3 kHz SSB filter, $173; YF-122C 500 Hz CW filter, $173; TCXO-9 High Stability Reference Oscillator, $99; FNB-72 NiCd battery pack, $60; NC-72B NiCd battery charger, $18.

MFJ-616 Speech Intelligibility Enhancer

Reviewed by Steve Ford, WB8IMY
QST *Managing Editor*

This is a tale of misspent youth. I spent the later half of the '70s finishing up college and running the soundboard for an unbelievably thunderous rock 'n roll band. Night after night I stood before a wall of Marshall amplifiers that generated enough acoustic energy to rattle the fillings in my teeth. After graduation, I spent a number of years as a rock radio DJ—and I loved setting my studio monitors to the threshold of pain. It was an exciting life, but there was an inevitable price to pay: my hearing.

No, I'm not deaf—at least not yet. But I have difficulty distinguishing individual voices in noisy environments. At age 46 I can't bear the thought of hearing aids, so I assemble the sentence fragments as best I can and hope that I understand the essence of what the person is saying. If all else fails, I smile and nod my head, not always quite certain what I am agreeing to.

Hamfests are particularly brutal environments for people like me, but a crowded HF phone band can be every bit as torturous. Whether you're listening to a speaker or headphones, your radio is dumping a firehose stream of audio with a bandwidth ranging from about 300 to 2500 Hz, depending on how you've configured your transceiver. The actual speech energy, however, is not constant throughout that passband; it tends to concentrate in particular frequency ranges (see the sidebar, "Speech Intelligibility and Frequency"). The rest is extraneous audio that interferes with your ability to understand what is being said.

DSP filtering will eliminate the annoying carrier whistles and clean up certain types of noise, but it does nothing to restrict or enhance specific audio frequency bands. (Worse still, DSP can often add an aliasing effect that gives speech a wispy, otherworldly sound.)

Enter the MFJ-616

What hearing-impaired amateurs need is a way to tailor the audio outputs of their receivers to match the response characteristics of their own hearing. The most efficient way to do this (as any home audio buff will tell you) is with an *equalizer*. An audio equalizer allows you to filter the audio signal in specific frequency groups to create an output that is best suited to your listening environment.

The MFJ-616 Speech Intelligibility Enhancer is essentially an audio equalizer designed for amateur use. It allows you to enhance or attenuate audio signals in four frequency ranges: 300, 600, 1200 and 2400 Hz, with an overall range of 100-5000 Hz. By adjusting the response in each band, you end up with a composite audio signal that matches the response of your hearing.

The MFJ-616 is packaged in a black enclosure measuring $2^1/_2 \times 10 \times 6$ inches. On the front panel there are six rotary potentiometer controls for **VOLUME**, **BALANCE**, **300 Hz**, **600 Hz**, **1200 Hz** and **2400 Hz**. You also find a pushbutton **BYPASS** switch (to compare the effect of the '616 to the actual audio output of your radio), an **INPUT A/B** switch (to select either of two audio inputs), a **SPEAKER ON/OFF** button and a **POWER ON/OFF** button. A $^1/_4$-inch stereo headphone jack is available as well.

On the rear panel, the MFJ-616 is equipped with a coaxial dc power socket (it requires 12 V dc at 1.5 A), **LEFT**, **RIGHT** and **STEREO** speaker outputs ($^1/_8$-inch jacks) and the **A** and **B** inputs (RCA phono jacks).

Inside the MFJ-616, the circuit design is straightforward. Unless you've opted to hit the **BYPASS** button, the audio from input **A** or **B** is fed to the **VOLUME** pot, then to the input of one section of a TL084 quad JFET-input general-purpose operational amplifier chip. After this initial boost, the audio goes to another TL084, this one using all four channels to provide four octaves of adjustable audio conditioning. The signal is recombined at yet another TL084 section functioning as a summing amp. At the output of this amplifier, a bridge-type **BALANCE** control splits the audio and sets a drive ratio for the output preamplifiers (yes, more TL084 sections). Two TDA1013B monolithic amplifiers handle the output chores. These chips are rated at 4 W output, but the MFJ-616 design runs them at a more conservative 3-W level.

Setting up the MFJ-616

Installing the MFJ-616 Speech Intelligibility Enhancer is a snap. The most elegant approach is to take audio from the auxiliary (accessory) jack of your transceiver, where it is usually available at a fixed level, and route it to either the **A** or **B** input. (The MFJ-616 has two inputs for those of us who own two radios.) My ICOM IC-706's line-level output was more than adequate to drive the unit. Alternatively, you can tap the audio at your radio's headphone or external speaker jack, but take care not to overdrive the input of the '616.

For the output of the MFJ-616, you have your choice of speakers or headphones. When I began hooking everything up, I wondered why the output was provided in stereo, even though the inputs were monaural. A split-second later, I understood. If you are listening to speakers, the room you are in will have its own acoustic damping or enhancing characteristics that can be balanced (as far as your ears are concerned) by adjusting the output of the individual speakers. And if your ears are unevenly matched in sensitivity, the ability to balance the channels when using headphones is a big help.

On the Air with the MFJ-616

My first experience with the MFJ-616 was on the 75-meter phone band. It was the best band I could think of for an endurance test. If you frequent 75 meters at night, you know it is a jumble of signals—some made by man and others contributed by Mother Nature. The result is a disconcerting audio stew.

After setting up two speakers (we purchased the MFJ-72 All-in-One accessory pack, which includes a pair speakers, a set of headphones and a power supply—see Figure 6), I switched in the '616, turned up the **VOLUME** to a comfortable level, and tweaked the **BALANCE** until the audio appeared to be centered directly in front of me. All of the equalizer's frequency controls were set to the neutral (12 o'clock) position.

Now the fun began. I tuned in a net and listened for a few minutes with the

BYPASS activated. I could understand everything that was being said, but I had to listen carefully. After placing the **BYPASS** in the **OFF** position, I began to adjust the four frequency knobs.

I expected a subtle effect at best, but I was astonished. Rolling off the low-end of the frequency range did wonders for me. Ditto for cranking in some attenuation in the 600-Hz passband. I left the 1200-Hz control at neutral, but added some enhancement at the high end with the 2400-Hz pot. The result was remarkably clean, understandable speech without hissing, ringing or other strange effects. After listening for a while, I began to forget what my radio really sounded like. A quick jab at the **BYPASS** button reminded me in the worst way!

Slipping on the headphones, I did a little more fine-tuning. For SSB I found that I achieved the best fidelity with the 300-Hz control fully counterclockwise (12 dB attenuation), the 600-Hz control at 9 o'clock, the 1200-Hz control at 11 o'clock and the 2400-Hz control at 1 o'clock. Of course, I'd find myself having to tweak a bit here and there, depending on the nature of the transmitted audio, as well as the person who was speaking.

Paul Pagel, N1FB, also spent some time twisting the knobs on the '616. Here's his impressions:

"Following tests some years ago, I learned that I've got built-in 4-kHz-wide audio filters. I've lost most of my aural high-frequency response (I used to be able to hear the squeal of TV horizontal oscillators). Now, chirping birds are more difficult to hear and my wife better understands that I'm not ignoring her. Although I can hear her, I don't always understand her!

"I readily accepted an invitation to give the MFJ-616 a try—not knowing what to expect. A glance at the control labels intuitively told me what each control would do, and brief experimentation verified that. A short spell listening to SSB signals with and without the '616 found me twiddling the controls to enhance the mid-range frequencies, dropping off some of the low and most of the high frequencies. Even with my high-frequency hearing loss, enough high-pitched noise typically gets through to be irritatingly distracting. Using the device to tailor the audio to my liking made listening more comfortable and enjoyable."

It's worth noting that the MFJ-616 also markedly improved the intelligibility of AM audio—especially shortwave broadcast audio. If you venture outside the amateur bands, you know that some shortwave broadcasters have less than sparkling fidelity. I found that the MFJ-616 often made a dramatic improvement in my ability to listen to these stations and clearly understand what was being discussed.

Figure 6—Accessories that are available for the MFJ-616 include the MFJ-1316 12 V 1.5 A dc wall transformer power supply, the MFJ-281 speaker and the MFJ-392 communications headphones. An accessory pack (MFJ-72) containing the headphones, the power supply and two speakers is also offered.

Speech Intelligibility and Frequency

The MFJ-616 manual includes some interesting results of research on speech intelligibility.

- The frequencies important for speech intelligibility range from 500 to 4000 Hz. The consonant sounds that fall in this range contribute 83% of word intelligibility.
- Frequencies from 500 to 1000 Hz contribute 35% of word intelligibility and 35% of sound energy.
- Frequencies from 1000 to 4000 Hz contribute 48% of intelligibility, but only 4% of the total sound energy.
- Frequencies from 125 to 500 Hz contribute 55% of the sound energy, but only 4% to word intelligibility.

In other words, nearly half the speech intelligibility is contained in the 1000 to 4000 Hz frequency range with only 4% of the speech sound energy. On the other hand, the low-end frequencies have most of the speech energy, but contribute *very little* to intelligibility. The idea of using the MFJ-616 is to maximize the frequencies that contribute the most to intelligibility, while minimizing those that do not.

Conclusion

The MFJ-616 Speech Intelligibility Enhancer is designed in recognition of the fact that many us need effective assistance to counterbalance our hearing disabilities, whether due to aging, illness, injury… or mistakes in our youth. Even those without hearing deficiencies, however, will enjoy the ability to tailor their receive audio. The benefits of the MFJ-616 are so profound, and yet the design is so clear-cut, it almost makes you kick yourself for not thinking of it first!

Manufacturer's suggested retail price: MFJ-616 Speech Intelligibility Enhancer, $169.95. MFJ-72 All-In-One Accessory Pack (including two MFJ-281 speakers, a set of MFJ-392 Communications Headphones and the MFJ-1316 12 V dc power supply): $58.80. These items are also sold separately.

Manufacturer: MFJ Enterprises, 300 Industrial Park Rd, Starkville, MS 39759; tel 662-323-5869; fax 662-323-6551; **www.mfjenterprises.com**. QST

NEW PRODUCTS

SELF CONTAINED DTMF KEYPAD

◊ Intuitive Circuits, makers of the DTMF 8 decoder, have recently announced the DTMF-ENC15, a self-contained dual tone multiple-frequency encoder board.

The $2^{9}/_{16} \times 2^{13}/_{16} \times 1^{3}/_{8}$ board has a full size 16-button keypad and can be powered by a 9 V battery or through a 2.1 mm dc input jack. Audio output is provided through a standard phono-type plug.

The DTMF-ENC15 is just the ticket for adding DTMF capabilities for autopatch, repeater control and remote control to radios that lack built-in keypads.

Price: $89. For additional information contact Intuitive Circuits LLC, 2275 Brinston Ave, Troy, MI 48083; tel 248-524-1918; fax 248-524-3808; **sales@icircuits.com**; **www.icircuits.com**. QST

Previous • Next New Products

TECHNICAL CORRESPONDENCE

REVISITING "CLEAN UP YOUR PSK31 SIGNAL"

By Richard J. Kruis, K8CAV, 6007 Route 82, Hiram, OH 44234;
major107ac@aol.com

◊ There are some items that need to be addressed concerning the interface published in *QST*.[1] The first and most obvious is that the potentiometer R1 is wired incorrectly. Very definitely my mistake; I was looking at it through the wrong port when I designed it. The correct wiring should show the pot wiper connected to the sound card via the center conductor of the cable and the hot end of the potentiometer connected to the transformer.

The next item concerns grounding. The grounds shown in the redrawn schematic are misleading. The grounding issue is addressed in the caption of Figure 1, but even there, part of it is misstated. The caption should have read "The shield/ground connections shown for *P2* through *P4* are isolated from the metal cabinet and each other." If this is followed, then the sound card and computer are effectively isolated from the radio equipment and no ground-loop problems will occur. The grounding shown for P1 and J1 is correct, unless the ground/common in the radio for the microphone and headphone are not the same, in which case the ground/common for P1 should be isolated.

If the interface is being used to feed the radio's mic connector, be aware of a couple of items that might need addressing. Some radios (such as the Kenwood TS-570) use a different common for the mic audio and the PTT functions. The schematic as shown will accommodate the separate commons. If the same common is used for the mic audio and PTT, simply jumper these two pins on J1. Next, some radios have a dc bias in the mic hot pin to power mic audio circuits. Placing a capacitor between center conductor of P3 and the hot end of the potentiometer will eliminate any problems a dc path might cause. Without knowing the impedances involved, it's difficult to specify a precise value for this capacitor, but a couple of quick calculations showed that a 47-µF capacitor should be large enough for all radios.

[1]Richard J. Kruis, K8CAV, "Clean Up Your PSK31 Signal," Technical Correspondence, *QST*, Feb 2001, pp 88-89.

You can substitute a 4N35 optoisolator for the 4N33 specified; they're pin-compatible.

My sincere apologies for any headaches this may have caused! If anything else comes up that you think I should address, please let me know.

DRIVE BELTS FOR HEATH AND OTHER GEAR

By William D. Wornham, NZ1D, 23 Burgess Rd, Townsend, MA 01469-1021;
nz1d@juno.com

◊ In the June 1999 Technical Correspondence column,[2] Art Pahr, K9XJ, suggested that **O** rings can be used to replace the rubber belts used to drive the variable capacitors in the final sections of Heath equipment such as the HW and SB series. In fact, the belts actually *are* **O** rings, which have been used for many years in magnetic recording mechanisms.[3] As Art discovered, a $^1/_8 \times 2^1/_8 \times 2^3/_8$ (OD) **O** ring works. I've also used slightly smaller ones ($^1/_8 \times 1^7/_8 \times 2^1/_8$ and $^1/_8 \times 2 \times 2^1/_4$) in an HW-100.

See Figure 1. If in doubt as to which size is needed, the length of an **O** ring (and **V** and flat drive belts) can be determined using the following formula for calculating belt length for pulleys:[4]

Belt length $L = 2S \cos \theta + \pi [(R+r) + (R-r)\ \theta/90]$ inches (Eq 1)

where:

S = Center distance between pulleys
R = Radius of large pulley
r = Radius of small pulley
$\theta = \sin^{-1} [(R-r)/S]$ in degrees

The pulley radius for **O** rings or **V** belts is the *pitch radius* (about 30% of the belt cross section added to the pulley radius at the bottom of the groove), although for small-diameter **O** rings as used earlier the difference is generally insignificant.

For example, using Equation 1 in a typical case, with two pulleys on 2-inch centers, one with a $^1/_2$-inch radius and one with a $^3/_8$-inch radius, results in L = 6.75 inches. A $2^1/_4$-inch OD **O** ring measures 6.67 inches.

You can use the foregoing information not only for Heath equipment drive belts but also for determining the belt size required for your Field Day generator, lawn mower, vacuum cleaner power head and more.

[2]Art Pahr, K9XJ, "Drive Belts for Heath Gear," Technical Correspondence, *QST*, Jun 1999, pp 77-78.

[3]W. Earl Stewart, *Magnetic Recording Techniques*, (New York: McGraw-Hill Book Co, 1958), p 109: "The synthetic rubber O ring, made primarily for packing glands in high-pressure lines, makes an excellent low-cost belt with near-optimum characteristics. It is uniform in cross section and texture, has a good coefficient of friction against most materials, resists the action of oil, and has a good combination of elasticity and mechanical hysteresis in stretching."

NEW AND IMPROVED?

By Ron Schilling, K7LN, 12330 Alcoy, Fenton, MI 48430-9420;
k7ln@aol.com

◊ In the August 2000 issue of *QST*, I read the correspondence of James Cherry,

[4]Robert H. Perry, *Engineering Manual*, (New York: McGraw-Hill Book Co, 2nd edition, 1967), p 8-39.

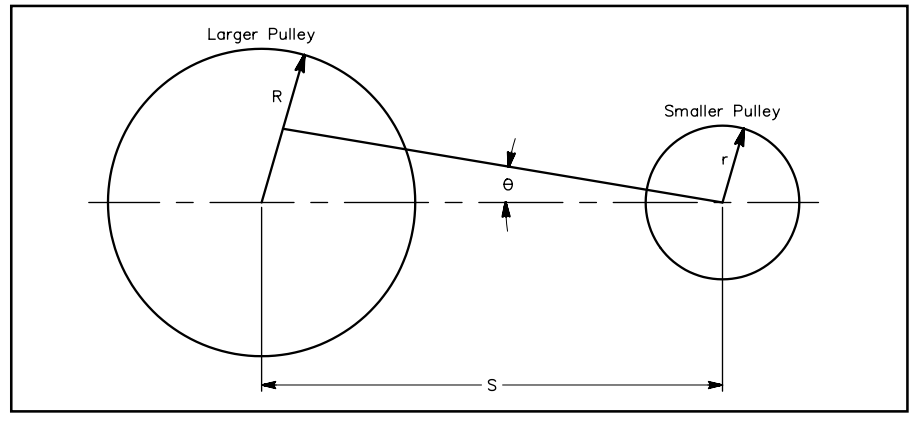


Figure 1—Determining the proper O-ring size for pulley drive belts can be done using the equation given in the text.

W3WGR, concerning his experiences with a switching power supply.[5] After reading it, I realized I wasn't alone! As a step up from my older tube rig, I had purchased a used ICOM IC-736 transceiver with a built-in switching power supply. But my happiness was short-lived. Soon after I started monitoring with the transceiver, I noticed a lot of heterodynes on various received signals. Often I would initially hear a clear signal only to have a spurious signal drift into and through my frequency of interest. These occurrences became very commonplace to the point that I quickly suspected the receiver was at fault. There just aren't *that many* "lids" operating on the foreign and domestic broadcast bands!

Being an engineer, I decided to conduct a few simple tests to locate the interference source. I frequently removed the antenna from the receiver to find the offending signal was still there. I'd shut the radio off and carefully listen to the signal as the supply voltage decreased. Ten to 30 seconds later, I'd turn the radio on and find that the unwanted signal was still present—initially with a different pitch, but it quickly returned to its former status. A long-term shutdown quenched the suspected spur at a given frequency, but as the radio heated up again, the signal would reappear. Yep! The transceiver had internally generated noise with a thermal element to it.

I opened the transceiver while it was operating at a stable temperature. The power-supply compartment was warm, but not hot. I removed the cover from the switching power supply [*Caution!—Ed.*]. An existing spurious signal quickly changed pitch. As the supply cooled, the signal pitch changed even more. Without touching anything, I put my finger *near* one of the TO-220-cased regulators. More changes in pitch were evident. With some finger positions, I could even kill the receiver! That is, the receiver would shut off totally, requiring another power-on cycle. Eventually, I shut things off and removed the problem power supply. I ran the receiver using an external 12-V dc linear supply and found that it was noise-free. I'd discovered the problem: the switching power supply.

I talked with technicians at ICOM who claimed that they had never heard of this before. All they could offer was to suggest that I check connections, grounds and capacitors. I had done all of this and nothing helped. Some of my Internet contacts confirmed that other ICOM transceiver owners were having a similar problem. Eventually, I gave up on the transceiver and sold it at a loss.

You might ask: "Being an engineer, why didn't you fix it?" Good question. In time, I may have been able to improve or fix it. But would it have been worth the effort? Originally, I had no schematics. (ICOM did later provide me with one as a result of my contacts with them.) Also, the ICOM IC-736 is a rather unique rig. It uses *two* internal switching supplies to provide 12 V dc for the entire transceiver and 24 V dc for the transmitter power amplifier. The 24-V source is generated first; the 12-V supply is derived from that source with a second switcher. It's an efficient use of space and rather complex in its operation. This is not something that's easy to modify other than to totally remove the built-in unit and use external 12- and 24-V supplies.

The noise-generation problems are compounded by the two power-supply switching circuits. Not only was *each* switcher generating its own spurious signals, the two switchers' spurious signals were beating against one another producing *more* spurious signals! In the unit I had, each switcher was operating near 107 kHz. So I heard the various spurs of each switching supply and the resultant signals of the mixing of the switching oscillator signals and their associated harmonics. When I read the article in the January 2000 issue of *QST* with its comments on the ICOM PS-85, it only confirmed what I already knew from experience.[6]

I grew up in the days of "boat anchors" such as the Heath DX-100 and US Navy RBB receivers. If I have to use a linear supply that weighs a few more pounds and takes up a bit more space, I'll live with it. Amateur Radio is a *hobby* and I don't have to please stockholders with my efficiencies. You can have the new and improved, I'll take the tried and true.

YAESU FT-847 POWER-SWITCH FIX

By Jerry McCarthy, WA2DKG, 12 Indiana St, Hicksville, NY 11801-2527; **wa2dkg@juno.com**

◊ The **POWER** switch in my Yaesu FT-847 transceiver became intermittent, sometimes cutting off unexpectedly. The inconvenience and expense of shipping the unit to Yaesu didn't sit well with me, so I decided to look into replacing the switch by using the **MOX** switch located on the front panel just below the **POWER** switch. These two switches are identical and I never use the **MOX** switch. As it turned out, it wasn't necessary to exchange the switches. Each switch is a double-pole, double-throw, latching switch. Only the common and normally open contacts of one pole of the **MOX** switch are used, the other pole is completely unattached.

To provide a parallel connection for the **ON** position of the **POWER** switch, I soldered two short jumpers from the **POWER** switch to the unused normally closed and common poles of the **MOX** switch. It isn't necessary to disassemble the front panel to do this; just swing it open as indicated on page 94 in the FT-847 owner's manual. Placing the additional two switch poles in parallel fixed the problem.

Technical Correspondence items have not been tested by *QST* or the ARRL unless otherwise stated. Although we can't guarantee that a given idea will work for your situation, we make every effort to screen out harmful information.

Letters for this column may be sent to Technical Correspondence, ARRL, 225 Main St, Newington, CT 06111, or via e-mail to **ppagel@arrl.org.** Please include your name, call sign, complete mailing address, daytime telephone number and e-mail address on all correspondence. Whether praising or criticizing a work, please send the author(s) a copy of your comments. The publishers of *QST* assume no responsibility for statements made herein by correspondents. QST

FEEDBACK

◊ Please refer to Rick Littlefield, K1BQT, "A Simple TRF Receiver for Tracking RFI," *QST*, Mar 2001, Figure 1, page 33. The input connections to U1A and U1B are shown reversed. Correct the schematic to show C10/R5 connected to U1A pin 2, the inverting input, and C12 connected to pin 3, the noninverting input. On U1B, the junction at R10 connects to pin 5, the noninverting input; the junction at R8 connects to pin 6, the inverting input.—*Rick Littlefield, K1BQT*

◊ Please refer to Sam Ulbing, N4UAU, "The World's Smallest Code-Practice Oscillator," *QST*, Feb 2001, p 41. In the biography, the URL for Sam's Web site is missing a letter. The correct URL is: **n4uautoo.home.sprynet.com**.—*tnx Sam Ulbing, N4UAU* QST

[5]James Robert Cherry, W3WGR, "Switching Power Supplies? Not for Me!," Technical Correspondence, *QST*, Aug 2000, p 75.

[6]Joe Bottiglieri, AA1GW, "*QST* Compares: Switching Power Supplies," *QST*, Jan 2000, pp 70-73.

HAPPENINGS

Amateur Radio Author, Sage Bill Orr, W6SAI, SK

Another Amateur Radio legend is gone. William I. "Bill" Orr, W6SAI, of Menlo Park, California, died in his sleep January 24. He was 81.

An ARRL member, Orr was best known for his voluminous publications for radio amateurs, including such reference gems as *The Radio Handbook*, *The Beam Antenna Handbook*, *The Quad Antenna Handbook*, *The VHF-UHF Manual* and *The W6SAI HF Antenna Handbook*, some written in collaboration with Stu Cowan, W2LX. Ironically, friends say, the lack of an antenna kept Orr off the air in the weeks before he died.

Licensed in 1934 at age 15 as W2HCE in New York, Orr graduated in electrical engineering from the University of California in the early 1940s. He worked for Douglass Aircraft during World War II.

In his younger years, Orr was a well-known DXer and DXCC Honor Roll member. He also was involved in DXpeditions to various exotic locations.

From the 1940s through the 1980s, Orr was a frequent contributor to *QST*, writing about tube-type amplifiers, Project OSCAR, and other topics. Orr constructed some of the amplifiers once used at ARRL Maxim Memorial Station W1AW.

For many years Orr worked for tube manufacturer EIMAC, and the company's application notes were favorite reading within the amateur community. In later years, Orr penned columns for *Ham Radio* magazine and, more recently, for *CQ*, where he edited "Radio Fundamentals."

Bill Orr, W6SAI

In 1996, Orr was named the Dayton Hamvention Technical Excellence Award winner.

Chip Margelli, K7JA, of Yaesu, called Orr "one of the technical giants in Amateur Radio." Margelli said a hallmark of Orr's talent was that he always published information for designs that had actually been proven in the field. "He also was a true gentleman, and I shall miss him greatly," Margelli said.

Those sentiments were echoed by his long-time friend Willard "Tiff" Tiffany, W6GNX, who said Orr had a knack for making technical topics easy to follow and understand. He remembered Orr as "a friendly, helpful guy who wrote from the heart because he enjoyed doing it." Another friend, Marv Gonsior, W6FR, says Orr "had a great sense of humor, a lot of wit about him."

Gonsior and Tiffany say that Orr remained active on the air but liked to keep a fairly low profile, because everyone recognized his call sign and wanted to ask him questions.

Orr owned a condominium in Maui, Hawaii, and he operated from there two or three times a year as KH6ADR.

Orr's wife, Sunny, died about five years ago, and he lived alone. He is survived by four daughters and a son. No funeral or memorial service was held. "It is my impression that while Bill always appreciated expressions of gratitude, they were not as important to him as was whatever help he may have been to hams everywhere," Tiffany said. Condolences may be sent to the family care of Orr's daughter: Judy Moltzen, 1015 Monte Rosa, Menlo Park, CA 94025.

Orr's family expressed its appreciation to those in the amateur community who wrote following his death. "The entire Orr family wishes to express our deep gratitude for all of your kind condolences upon the death of our father William I. Orr, W6SAI. We have received e-mails from all over the world, and are proud that our father's legacy will live on through people like you, his treasured Amateur Radio family," the letter said in part. "It is of great comfort to us to know that you will miss him too. He was our hero and will be forever missed." The Orr family invited donations to The ARRL Foundation in his memory.

ARRL Takes Part in ITU Study of Unwanted Emissions

The ARRL Technical Relations Office in Washington participated in International Telecommunication Union studies of "unwanted emissions" in the radio spectrum. The studies were completed earlier this year. Unwanted emissions consist of out-of-band and spurious emissions. The ITU-Radiocommunication Sector has conducted two multi-year studies of unwanted emissions during the past decade.

ARRL Technical Relations Manager Paul Rinaldo, W4RI, of the League's Washington office chaired a second-round task group with an international membership, drafting out-of-band emission specifications. ARRL Lab Supervisor Ed Hare, W1RFI, and his staff participated in task group meetings and provided technical support. Representatives of the International Amateur Radio Union also took part.

Had we not invested all those hours and travel, the amateur and amateur-satellite services probably would have some limits on unwanted emissions that would be more difficult to meet and make amateur equipment more costly.

"Had we not invested all those hours and travel, the amateur and amateur-satellite services probably would have some limits on unwanted emissions that would be more difficult to meet and make amateur equipment more costly," Rinaldo

Rick Lindquist, N1RL ♦ Senior News Editor

NEW ADMINISTRATION SPURS FCC SHUFFLE


FCC PHOTO

FCC Chairman Michael K. Powell.

The advent of the George W. Bush administration prompted the departure of William Kennard as chairman of the Federal Communications Commission. A Democrat and a Clinton appointee, Kennard was the first African-American to serve as FCC chairman. As expected, Bush named 37-year-old Michael K. Powell to replace Kennard. A Republican and an FCC member since 1997, Powell is the son of Secretary of State Colin Powell.

Powell served as the FCC's Defense Commissioner. He also was the FCC representative to the President's Council on Year 2000 Conversion, established to address the Y2K computer problem. Powell came to the FCC from the Department of Justice, where he served as the chief of staff of the Antitrust Division.

At his first official meeting as chairman in February, Powell sounded out his bureau chiefs on ways to make their operations more efficient and personnel more knowledgeable about current technology.

In the weeks that followed Powell's accession to the chairmanship came word that Powell's Commission colleagues would also be leaving the regulatory agency, giving Bush a free hand to name a new FCC. By law, no more than three of the Commission's members can be of the same political party.

Republican Commissioner Harold W. Furchtgott-Roth, a Clinton appointee, was the first to announce that he would not seek reappointment to a second term and would return to the private sector. Furchtgott-Roth planned to continue serving until a mutually agreeable departure date could be worked out with the Bush administration. Furchtgott-Roth has served as the *de facto* conservative voice on the FCC.

There followed news reports—but no formal announcements as of press time—that the two remaining commission members, Democrats Susan Ness and Gloria Tristani, also were poised to depart the FCC. Ness said she would not seek another term and would step down after Bush picked another Democrat to fill her spot on the five-member panel. It was not considered likely that Bush would have reappointed Ness, the Commission's senior member, who was serving under a Clinton recess reappointment.

Ness was the FCC's senior representative at the 1995, 1997 and 2000 World Radiocommunication Conferences. In public statements, she has suggested that adequate spectrum needs to remain available for Amateur Radio, public safety, unlicensed Part 15 devices and experimental and scientific purposes.

News accounts said that Tristani is planning to leave the FCC by the end of the year, possibly to pursue elective office in her home state of New Mexico. Nominated by Clinton, Tristani joined the FCC in 1997, and her term doesn't expire until June 30, 2003. While on the FCC, Tristani headed the FCC's V-Chip Task Force. The V-Chip, now required in TV sets with screens 13 inches or larger, allows parents to block television programming that they believe may be harmful to their children.

Several names have surfaced as possible Bush nominees to the FCC, but as of press time, no FCC nominations had been announced.

FCC BEGINS WRC-2003 PREPARATIONS

In preparation for the next World Radiocommunication Conference in 2003, the FCC's WRC-03 Advisory Committee met for the first time January 30 at FCC Headquarters in Washington. The FCC International Bureau's Planning and Negotiations Division has primary responsibility for guiding the FCC's WRC-03 efforts.

A WRC-03 Web site has been set up at **www.fcc.gov/wrc-03** along with a mailbox for the committee, **wrc03@fcc.gov**.

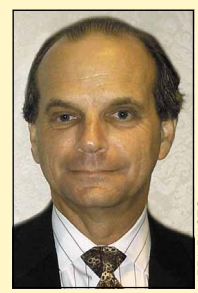
The Advisory Committee provides an opportunity for interests outside the federal government to develop and debate US draft proposals for possible adoption by the FCC, the National Telecommunications and Information Administration and the US Department of State.

WRC-03 will deal with wide-ranging telecommunications issues, including IMT-2000 or so-called "third-generation" or "3G" cellular telephone devices, fixed services, mobile and fixed-satellite issues, HF broadcasting, satellite broadcasting, and regulatory matters.

Amateur Radio-related issues on the WRC-03 agenda include the revision of Article S25 of the international *Radio Regulations*—the basic rules for the Amateur and Amateur-Satellite services. This includes the issue of whether to retain the treaty requirement to demonstrate Morse code proficiency for access to amateur bands below 30 MHz.

A small sampling of amateur comments filed to the FCC as of press time showed that sentiments remain strong on both sides of the Morse issue, but opinion was divided roughly evenly about its retention as a requirement for HF licensing.

Hollingsworth High on Powell, Enforcement Future


ARRL PHOTO

FCC Special Counsel for Amateur Radio Enforcement Riley Hollingsworth says new FCC Chairman Michael Powell has a solid relationship with the Enforcement Bureau. "I'm delighted," Hollingsworth said of Powell's appointment. "He's a very sharp guy."

Hollingsworth predicted that the changing of the guard in the White House and at the FCC would not alter the course of the current amateur enforcement effort. He said he sees nothing but positive changes ahead.

"I'm willing to bet my Hallicrafters SX-115 that we won't miss a beat," he said, referring to one of his latest acquisitions of vintage ham gear, "as long as the amateur community lets it be known it still wants enforcement."

Hollingsworth said it was pressure from the ARRL and individual amateurs that prompted the resumption of amateur enforcement in 1998 during Kennard's tenure, "and it's the type of program that needs that continual pressure to keep it going," he added. Overall complaints are down, Hollingsworth said, "but no one can be complacent."

In an interview as he entered his third year spearheading the FCC's Amateur Radio enforcement effort, Hollingsworth said he was encouraged that the vast majority of amateurs support the FCC's enforcement program and follow the rules. But Hollingsworth said that "radio rage" in the form of such things as on-air squabbles or frequency fights could degrade the bands just as quickly as outright rulebreaking. "The FCC can't do anything about that," he said. "It's up to the amateur community."

Hollingsworth said that while much radio rage is not technically illegal, it reflects negatively on Amateur Radio. More important, he said, rude or intemperate on-air behavior might provide just the sort of ammunition that an entity seeking additional spectrum might use against Amateur Radio.

WRC-03 also will review the terms and definitions of Article S1 to the extent required as a consequence of any changes made in Article S25. Among other things, Article S1 contains the definition of the Amateur and Amateur-Satellite services. In addition, WRC-03 participants are expected to review the provisions of Article S19 concerning the formation of call signs in the amateur services, in order to provide flexibility for administrations.

WRC-03 will consider realignment of amateur and broadcasting bands around 7 MHz on a worldwide basis. The long-standing problem was identified in a WARC-92 recommendation that called for realignment at a future conference. The International Amateur Radio Union is committed to supporting a "harmonized" worldwide 300-kHz allocation in the vicinity of 7 MHz.

An examination of the adequacy of HF broadcasting allocations from approximately 4 to 10 MHz is on the agenda. Conference participants also will consider abandoning an earlier commitment for HF broadcasters to shift from double to single-sideband AM modulation and move instead to digital modulation.

Among other issues that could affect Amateur Radio, WRC-03 will consider allocations for non-geostationary, non-voice mobile satellites (the so-called "Little LEOs") below 1 GHz, as well as spectrum above 1 GHz for feeder links. In addition, the conference will consider Earth Exploration-Satellite Service in the 420 to 470-MHz band.

ARRL Technical Relations Manager Paul Rinaldo, W4RI, says that most of the issues of concern to amateurs have been assigned to the WRC-03 Advisory Committee's Informal Working Group 6. ARRL Technical Relations Specialist Walt Ireland, WB7CSL, has been appointed as vice chairman of IWG-6. Rinaldo says Ireland's presence "will be key in seeing that amateur issues have fair treatment." He said Ireland's experience with the Voice of America also will be helpful in dealing with HF broadcasting issues.

Expected to take place in Venezuela, WRC-03 is scheduled to begin June 9, 2003, and continue until July 4, 2003.

Amateur Radio Enforcement

♦ **Ex-ham gets jail, probation for unlicensed operation:** Former amateur Richard Allen Burton has been sentenced to three months in jail and one year's probation for unlicensed operation of a radio transmitter. Burton also must undergo psychological treatment. Sentenced January 22, Burton was scheduled to begin serving his term February 26. The FCC said he'd been operating without a license on repeaters in Southern California. Burton had been free on $20,000 bond. Formerly WB6JAC, Burton lost his General ticket in 1981 as a result of unspecified violations. Since then, he'd racked up a lengthy history of alleged unlicensed operation, most or all of it on amateur frequencies. He has served jail time and probation as a result of earlier convictions. Burton was arrested last August 5 following his indictment by a federal grand jury in California. He faced six felony counts of violating the Communications Act of 1934.

♦ **Ohio ham stacks up sanctions:** Already under a short-term renewal imposed last year for alleged deliberate interference, an Ohio ham has received another FCC sanction as a result of similar infractions. The FCC notified General licensee Jeffrey J. Pipenur, WA8IKW, of Vandalia, on February 7, that his Amateur Radio license was being modified to prohibit operation on all HF bands except 30 meters until February 10, 2004. The FCC's action comes in the wake of continued allegations of deliberate interference on the part of the licensee. Last March 1, after considering Pipenur's response to earlier FCC allegations of "deliberate interference, poor Amateur practice, and operation contrary to" FCC rules, the FCC set aside his renewal grant and renewed his license for one year. The FCC said Pipenur did not deny the activity, apologized, and consented to the short-term renewal, granted with the condition that there be no further violations. Last November, the FCC confronted Pipenur with additional allegations, including monitoring information, that he had deliberately interfered with ongoing amateur communications on 75 meters. FCC Special Counsel for Amateur Radio Enforcement Riley Hollingsworth threatened to designate Pipenur's license for a revocation and suspension hearing. Instead, Pipenur agreed to avoid a hearing and settle the matter by letting the FCC modify his license to restrict his operation to frequencies above 30 MHz with the exception of the 30-meter band. Hollingsworth told Pipenur that his renewal would be granted with the restrictions stipulated. But he warned Pipenur that this was his last chance to avoid more serious sanctions, including license revocation.

said. The panel's recommendations were being circulated to governments for final approval.

Out-of-band emissions are those falling outside the necessary bandwidth of a signal and are the result of modulation. "Amateurs know them as key clicks and splatter," Rinaldo said. Out-of-band limits for amateur equipment were agreed upon at the final task group meeting last year, and Rinaldo says these are consistent with the idea of establishing a safety net—not stringent emission levels.

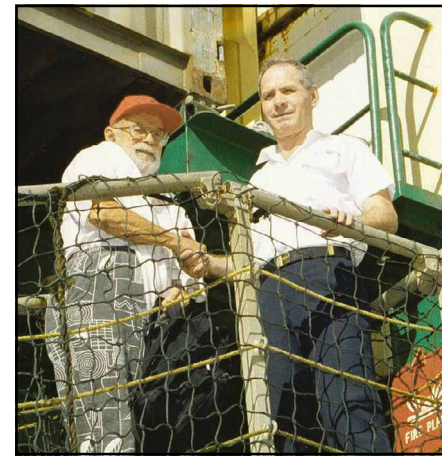
The ITU defines spurious emissions as emissions beyond 250% of the necessary bandwidth, but the definition is still under debate. Spurious levels already are spelled out in the international *Radio Regulations*. ARRL Lab tests have shown that current amateur gear could meet a standard of –50 dB relative to main signal for HF and –70 dB for VHF bands and above.

A suite of ITU-R recommendations on unwanted emissions is being circulated and should be approved by mid-year.

More work lies ahead for the ARRL Washington staff. Radio astronomers and earth-exploration passive services are not satisfied with present levels of unwanted emissions from satellites and are concerned about interference to their sensitive receivers. A new ITU task group is studying the issue and preparing information for presentation at the next World Radiocommunication Conference in 2003.

KB6TAM VOWS TO RESURRECT ROUND-THE-WORLD SAIL

Within hours of a maritime disaster in which his sailboat sank and his beloved canine companion Mickey was lost at sea during the rescue effort, 76-year-old David Clark, KB6TAM, was ready to



PHIL SORENSEN, ZS2NP

A grateful David Clark, KB6TAM (left), shakes hands with Capt Victor Popov of the container ship *Emonte*.

once again set sail. Despite the devastating loss, Clark has vowed to continue his effort to become the oldest person to sail solo around the world.

Clark may have ham radio to thank for being alive. According to media accounts, when Clark realized he was in trouble, he used his onboard ham gear to call for help.

Following his rescue February 7, Clark told his wife, Lynda, that he would complete his journey "if I have to swim." Clark had begun the final leg of his round-the-world sail when his vessel, the *Mollie Milar*, sank two days after leaving Cape Town, South Africa. He had hoped to reach Ft Lauderdale, Florida—where he began his journey in late 1999—by mid-May, a sail of approximately 7000 nautical miles from South Africa.

When his vessel began taking on water, Clark reportedly put out a distress call via Amateur Radio. The call was heard and relayed to maritime rescue authorities. "It was very fortunate that there was a ship close by," said Lynda Clark.

The container vessel *Emonte* launched a lifeboat with a crew of four, which subsequently capsized. The ship then maneuvered within a few feet of Clark's 44-foot steel-hulled sailboat. A line was thrown, and Mickey, a West Highland terrier, was put into a sling to bring him aboard first, but he wriggled free and was lost at sea. For his part, Lynda Clark said, "David had all he could do to get himself up the side of that ship at this point, and limited time to do it."

Clark told his wife, Lynda, that he would complete his journey "if I have to swim."

At press time, Clark was back in Cape Town, and, with help from several South African hams and others, was making plans to restart his adventure with another vessel.

"He will get to Ft Lauderdale to complete the goal, we just don't have the date yet," Lynda Clark said. For more information, visit **www.dclark.com** and **www.captainclark.com**.

W8HKY: HAMMING IT UP AT 100

ARRL member Michael J. Anuta, W8HKY, of Marinette, Wisconsin, turned 100 years old on February 4. To mark the occasion, the ARRL sent special greetings to Anuta, who is among the very oldest League members.

"We at the League are so happy that you are one of our senior members and still an active and vibrant Amateur Radio operator," wrote ARRL Executive Vice President David Sumner, K1ZZ. On behalf of the ARRL Board of Directors, Sumner congratulated Anuta on attaining centenarian status.

On hand for the birthday celebration was ARRL Wisconsin Section Manager Don Michalski, W9IXG. "Mike lives in a retirement apartment complex along with his wife, Marianne, who is 99 years old," Michalski reported. "He is in good health and is extremely sharp and witty. We had a wonderful discussion about his past experiences which he remembers like they were yesterday."

Although Mike Anuta first became interested in ham radio as a Boy Scout in 1917, he didn't get his ticket until much

AO-40 Needs a New Attitude

The key to a successful AO-40 recovery continues to be a matter of reducing spin and regaining the ability to adjust AO-40's attitude from the ground. Only when ground controllers can accurately determine the satellite's attitude will it be possible to change it and correctly aim AO-40's high-gain antennas for optimal reception on Earth.

It's also believed that AO-40 might have suffered antenna system damage. Ground controllers have had no luck hearing AO-40's transmitters on the omnidirectional antennas on 2 meters, 70 cm or 1.2 GHz. Since the satellite's computer was reset and telemetry resumed December 25, the AO-40 ground team has been analyzing telemetry sent via the 2.4 GHz beacon—the only transmitter now operating.

In a February dispatch on AO-40, AMSAT-Germany waxed nearly poetic in describing the satellite's present situation. "AO-40 is currently like a ship that's lying on a sandbar in the fog at low tide," an update on the AMSAT-DL Web site declared. AMSAT-DL said AO-40 was "in the fog" because its high angle with respect to the sun temporarily prevents

the sun sensors from providing attitude data. It's "at low tide" because the steep solar angle means less illumination of the solar panels and less energy produced. And it's "on a sandbar" because the satellite can't be set free from its present situation without some effort.

Ground controllers had been hoping that a "de-spinner" programming routine could permit AO-40 spin control without having to rely on the sun sensors. But the sun began triggering the sensors again in late February, and ground controllers were hoping the better sun angle would permit orienting the spacecraft to fire the arc-jet using only ammonia, testing that system and raising the perigee by about 100 km. Once the spin is reduced using the magnetorquers, the satellite's attitude can be improved and antennas pointed. Still outstanding were tests of the VHF and UHF transmitters, the arc-jet motor, and the reaction wheels, among others.

AO-40 is currently like a ship that's lying on a sandbar in the fog at low tide.

Both AMSAT-DL President and AO-40 Project Leader Karl Meinzer, DJ4ZC, and AMSAT-NA President Robin Haighton, VE3FRH, have continued to be optimistic that AO-40 will have a useful life of Amateur Radio service.

AMSAT-UK's Richard Limebear, G3RWL, has suggested that AO-40 could at least be used for "some kind of 400 baud PSK digital communication" via one of the onboard computers. Limebear said that if the IF matrix is functional, then, SSB or CW via a linear transponder would be possible. "If AO-40 reaches such a state, we will get as much or more than AO-10 and AO-13 offered, only on more state-of-the-art frequencies," he concluded.

TOM RYNISH, N8LHB

Wisconsin Section Manager Don Michalski, W9IXG (left), presents ARRL member Mike Anuta, W8HKY, with a special plaque from ARRL Headquarters that commemorates Anuta's 100th birthday.

later. First licensed in 1952 as WN8HKY, Anuta upgraded and remained active through the 1970s. When he moved into a retirement apartment, he sold his equipment but, fortunately, kept his General license current.

Last year, Anuta read a newspaper account of the 50th anniversary of the Marinette and Menominee Amateur Radio Club, and he decided to rejoin. He bought a 2-meter hand-held radio and now regularly checks into the club's Sunday night 2-meter net—usually the first to do so. Anuta also rejoined the ARRL.

Anuta told Michalski that he remembers his first encounter with the radio hobby during World War I, when he became fascinated with communication using semaphores, "and that lead him on to spark gap radios and railroad telegraphy," Michalski said. "He has used AM and SSB radios, but his favorite mode is CW."

Asked where he'd like the hobby to move, Anuta said he thinks amateurs should continue to experiment with new methods of communication. "Our future depends on it," he said.

Anuta spent 67 years as an attorney. He and his wife recently celebrated their 79th wedding anniversary. Michalski said Mike loves to write letters and would enjoy hearing from other amateurs. His address is Michael J. Anuta, W8HKY, 1200 Northland Terrace Ln, Apt 106, Marinette, WI 54143.—*Jim Callow, K8IR; Badger State Smoke Signals; Don Michalski, W9IXG*

THREE ARRL SECTIONS GET NEW SECTION MANAGERS

Three ARRL sections will get new section managers, while incumbents were declared elected in six others. All new terms begin April 1.

The only contested race was in Kentucky, where challenger John D. Meyers, N4GNL, of Butler, outpolled incumbent

In Brief

• **K2DO appointed to chair ARRL Public Relations Committee:** ARRL New York City-Long Island Public Information Coordinator Diane Ortiz, K2DO, has been appointed to chair the ARRL Public Relations Committee for 2001. Lead Editorial Systems Technician for *Newsday* as well as *QST* "YL News" Editor, Ortiz will be taking over a mostly new committee recently appointed by ARRL President Jim Haynie, W5JBP. Ortiz said she joins Haynie in expressing appreciation to all past committee members for their service on behalf of ARRL and the amateur community. The ARRL also has conveyed sincere thanks to past PR Committee Chairman Dave Bell, W6AQ, for his steadfast commitment to Amateur Radio public relations and the efforts of the PR committee. Ortiz said she hoped to be able to call on her former committee colleagues and PR experts for their advice in the year ahead. Ortiz was the winner of the 2000 ARRL Philip J. McGan Memorial Silver Antenna Award for her public relations efforts. She invites anyone wishing to share ideas about Amateur Radio public relations to contact her at **hamyl@aol.com**.

• **ARRL Outgoing QSL Service announces revised rates:** The ARRL Outgoing QSL Service has announced a new and simplified rate structure, effective March 1, 2001. The new basic rate will be $4 per one-half pound (8 ounces, or approximately 75 cards) or any portion of a half-pound, a change from the current rate of $6 per pound or any portion. DXers still may ship 10 cards for $1, but the 20 and 30-card rates are being discontinued. The new rate structure will help to cover basic handling costs for smaller packages while actually offering a price break to moderate-volume users submitting up to one-half pound of cards. Under the current rate schedule, a half-pound of cards would cost $6, but it will be $4 under the new schedule. The new rates are in response to the recent postal rate increase and price restructuring. The Outgoing QSL Service is available to ARRL members. The last rate increase was in January 1999. For information on using the ARRL Outgoing QSL Service, visit **www.arrl.org/qsl/qslout.html**.

• **ARRL Foundation elects officers:** The ARRL Foundation Inc held its annual meeting via teleconference on January 23 and elected a new slate of officers. The new officers are New England Division Director Tom Frenaye, K1KI, President; Dakota Division Director Jay Bellows, K0QB, Vice President; retired investment banker Roger Franke, K9AYK, Treasurer, and ARRL Field and Educational Services Projects Supervisor Mary Lau, N1VH, Secretary. All officers are elected for one-year terms. ARRL Hudson Division Director Frank Fallon, N2FF, was appointed by the ARRL Board of Directors as a new Foundation Board member; ARRL Southeastern Division Director Frank Butler, W4RH, and ARRL Honorary Vice President and former Central Division Director Ed Metzger, W9PRN, were reappointed to the Foundation board. The term of office for directors is three years.

• **OMIK now an ARRL-affiliated club:** OMIK, the national organization of African-American amateurs, now is an ARRL-affiliated organization. An ARRL Charter of Affiliation was presented to OMIK January 27 in Atlanta, since OMIK President Frank T. Smith, K1UB, resides in Fayetteville, Georgia. OMIK, which is pronounced "Oh-Mike," was organized in 1952. The name OMIK stands for Ohio, Michigan, Indiana and Kentucky.

• **Vote on *QST* Cover Plaque Award:** The winner of the *QST* Cover Plaque Award for January was Murray Greenman, ZL1BPU, for his article "MFSK for the New Millennium." The winner of the February award was Larry Scheff, W4QEJ, for his article "How to Maximize Your Receiver's Effective Selectivity" (Part 1). Congratulations, Murray and Larry! The winner of the *QST* Cover Plaque award—given to the author(s) of the best article in each issue—is determined by a vote of ARRL members. Voting takes place each month on the ARRL Members Only Web site.

• **W1 QSL Bureau changes address:** Effective immediately the address of the ARRL W1 Incoming QSL Bureau has changed. The new address is: W1 Incoming QSL Bureau, YCCC, PO Box 7388, Milford, MA 01757-7388. Mail sent to the Springfield address will be forwarded for up to one year.

SM William L. "Bill" Uschan, K4MIS, and another challenger, David W. Glass, WA4QAL.The final tally was 244 votes for Meyers, 236 for Uschan, and 137 for Glass. Ballots were counted February 20 at ARRL Headquarters.

In Arkansas, Bob Ideker, WB5VUH, of Little Rock ran unopposed and was declared elected to succeed Roger Gray, N5QS. Gray decided not to seek another term. In North Texas, Larry Melby, KA5TXL, of Dallas—appointed to take over the reins from Donald Mathis, KB5YAM, on March 1—ran unopposed and was declared elected to a full term in his own right.

Incumbent section managers were re-elected without opposition in six other ARRL sections. They include Cliff Hauser, KD6XH, Arizona; Jim Lasley, N0JL, Iowa; Randy "Max" Wendel, KM0D, Minnesota; Malcolm Keown, W5XX, Mississippi; Joe H. Brown, W6UBQ, Orange, and Robert Williams, N7LKH, Wyoming. Wendel agreed to run again last year when no other candidates came forward, and he has remained in office in the interim. As a result, his term will run through September of next year.

ARRL OPEN FOR BUSINESS AS CSCSA

The ARRL is open for business as an FCC-designated Club Station Call Sign Administrator. With the exception of vanity call sign applications, the FCC now only accepts club station applications from one of the three FCC-designated CSCSAs. The three CSCSAs are ARRL, W4VEC Volunteer Examiners Club of America, and W5YI-VEC.

"Beginning this program has been a relatively painless and very straightforward process," said ARRL-VEC Manager Bart Jahnke, W9JJ. Once an application is received at the ARRL-CSCSA, processing typically takes two business days, Jahnke said.

Starting January 22, the FCC began accepting new, modification and renewal applications for Amateur Radio club and military recreation stations only from a designated CSCSA. These may only be filed as original, hard-copy applications using the NCVEC Form 605 or W4VEC Form CSCSA. On-line filing via the Universal Licensing System to modify or renew a club or a military recreation station license no longer is available. Applications to renew Radio Amateur Civil Emergency Service—or RACES—licenses also must be filed via a CSCSA, but the FCC no longer issues or renews RACES licenses.

The NCVEC 605 application form is available on the ARRL Web site, **www.arrl.org/fcc/forms.html**.

The new CSCSAs receive and process hard-copy applications and submit the information electronically to the FCC. The Club Station Call Sign Administrators do not charge for their services nor do they handle requests for vanity call signs. All applications for vanity call signs must be filed directly with the FCC.

WWV SURVEY PLANNED

The National Institute of Standards and Technology plans to survey users of WWV and WWVH this spring and summer. The time and frequency-standard stations have been airing occasional announcements about the upcoming poll in order to start building a mailing list of survey recipients.

WWV Station Manager John Lowe said the survey itself would not be released until approved by the Office of Management and Budget, and he did not expect that to happen until May, although it could be sooner. The survey period likely would extend through the summer, he said.

According to Lowe, the last WWV-WWVH user survey was done in 1985. "We just don't know who our user base is anymore," he said. Lowe confirmed that the data collected ultimately could be used to determine whether WWV and WWVH remain on the air—especially given the popularity of NIST's other outlets, including its Web-based time server that gets in excess of 3 million hits a day.

"If we get only two people who say they're using WWV, then we've got a problem," he said. Lowe added that he does not think WWV and WWV will be shut down, but he vowed to "fight for the radio stations," if it came down to that.

Lowe strongly encouraged WWV users to get on the mailing list and to send in a survey when the time comes. He suggested, however, that more weight would be given to survey responses from corporate and institutional users of the radio service as opposed to individual users.

To get on the NIST WWV-WWVH survey mailing list, send your name and address to the NIST Radio Station WWV, 2000 E County Road 58, Ft Collins, CO 80524, or e-mail the information to **nist.radio@boulder.nist.gov**. Lowe urged WWV-WWVH users to hold their fire until the survey begins.

WWV in Ft Collins, Colorado, and WWVH on Kauai, Hawaii, broadcast continuous time and frequency information to millions of listeners worldwide. For more information, visit the NIST Web site, **www.nist.gov**.

SECTION MANAGER ELECTION NOTICE

To all ARRL members in the Colorado, Georgia, Los Angeles, Sacramento Valley, San Francisco, South Texas, Washington and West Virginia sections. You are hereby solicited for nominating petitions pursuant to an election for Section Manager (SM). Incumbents are listed on page 12 of this issue.

To be valid, a petition must contain the signatures of five or more full ARRL members residing in the section concerned. Photocopied signatures are *not* acceptable. No petition is valid without at least five signatures, and it is advisable to have a few more than five signatures on each petition. Petition forms (FSD-129) are available on request from ARRL Headquarters but are not required. We suggest the following format:

(Place and Date)

Field & Educational Services Manager
ARRL
225 Main St
Newington, CT 06111

We, the undersigned full members of the _____ ARRL section of the _____ division, hereby nominate _____ as candidate for Section Manager for this section for the next two-year term of office.

(Signature ___ Call Sign ___ City ___ ZIP __)

Any candidate for the office of Section Manager must be a resident of the section, a licensed amateur of Technician class or higher and a full member of the League for a continuous term of at least two years immediately preceding receipt of a petition for nomination. Petitions must be received at Headquarters by 4 PM Eastern Time on June 8, 2001. Whenever more than one member is nominated in a single section, ballots will be mailed from Headquarters on or before July 1, 2001, to full members of record as of June 8, 2001, which is the closing date for nominations. Returns will be counted August 21, 2001. Section Managers elected as a result of the above procedure will take office October 1, 2001.

If only one valid petition is received from a section, that nominee shall be declared elected without opposition for a two-year term beginning October 1, 2001. If *no* petitions are received from a section by the specified closing date, such section will be resolicited in the October 2001 *QST*. A Section Manager elected through the resolicitation will serve a term of 18 months. Vacancies in any Section Manager's office between elections are filled by the Field & Educational Services Manager. You are urged to take the initiative and file a nomination petition immediately.—*Rosalie White, K1STO, Field & Educational Services Manager*

REPEAT NOMINATING SOLICITATION

Since no petitions were received for Montana Section Manager elections by the deadline of December 8, 2000, nominating petitions are herewith solicited. See the above for details on how to nominate. QST

Ski-to-Sea Race: A Communications Challenge

By Gary L. Crawford, W7GLC

Ski-to-Sea is an annual race event that takes place on Memorial Day weekend in Whatcom County, Washington. The race starts early in the morning on the ski slopes of 10,700 foot-high Mt Baker. Mt Baker is a dormant volcano, and a sister mountain to the now famous Mt Saint Helens, which erupted in 1980. Both mountains are part of the Cascade Mountain range that stretches from British Columbia to California and are famous worldwide for their ski slopes and volcanic activity. Mt Baker is also the world record holder for the deepest snowfall in one year—over 200 feet!

Worldwide Participation

The race attracts over 400 eight-member teams from around the world. Some are past gold-medal Olympic winners. The race begins on the mountain but ends at Bellingham Bay near the Fairhaven historic area of the City of Bellingham. (Bellingham is part of the Puget Sound region north of Seattle and near the San Juan Islands in northwest Washington State.) Between the start and end of Ski-to-Sea are 85 miles of treacherous downhill ski slopes, cross-country snow trails, backpacking trails, fast-flowing mountain rivers and a saltwater bay.

The History of Ski-to-Sea

The Ski-to-Sea race traces its inception to 1911 when the first Mt Baker Marathon pitted man against the elements of the mountain. Runners would start and finish the race from Bellingham by running and walking to the top of the mountain and back. The Mt Baker Club developed the idea of the race in an attempt to have the North Cascade Mountain Range designated as a national park. The race was used as a publicity stunt to focus the government's attention on the region. In 1913, after a near-fatal accident in which a runner fell into a crevasse on the mountain, the race was cancelled.

In 1973, Ski-to-Sea was reborn into the event that it has become today. Participants race down the hill in a seven-leg relay consisting of cross-country and downhill skiing, running, road and mountain biking, canoeing and kayaking. Amateur Radio operators from the Mt Baker Amateur Radio Club have been an important part of the race since its rebirth. Club members, in a coordinated effort, provide communications to race officials from the backcountry mountain terrain to the sea some 85 miles away from the starting point. Each team member participates in one leg of the race in a relay configuration.

Difficult Communications

Racing from the mountain to sea level is no easy task for team members. Neither is providing communications for race officials, law enforcement, emergency medical responders and others. All have a need to keep track of the 3200 race participants and 80,000 spectators who attend the event every year. The Ski-to-Sea officials depend entirely on the communications provided by amateur operators, and so do any of the emergency response agencies whose own radio systems do not cover many parts of the rugged backcountry areas that the race participants have to traverse. Club members from the Mt Baker Amateur Radio group use several different repeaters and simplex frequencies in order to create the communications links needed to cover the entire course.

The race day is held on Sunday of the long weekend, but planning begins months in advance. Nick Crisouola, N7MMH, is the Mt Baker Amateur Radio Club race coordinator. Nick says that the biggest task for him is attending all the required planning meetings throughout the year. "Club members know their jobs. Some members have been participating in this event over 15 years and do a great job of training newer members who want to help. Our objectives are to relay race status to race officials. They need to know where participants are in the race course, who is in the lead, and which teams are delayed."

In Case of Accidents...

Racing accidents do happen, and the Ski-to-Sea is no exception. "During the race, ham radio operators keep us informed as to where we are needed and the extent of the injuries sustained by the race team members," said Battalion Chief John Crawford, KC7YML, of the Marietta, Washington, Fire Department. "We have part of the river canoe and the mountain bike legs of the race in our community. Canoe paddlers tip over and mountain bikers crash. We need to know where these incidents happen, and we need to know fast. The hams provide spotters on the racecourse with portable radios who are able to communicate with our command post. The information we receive from the ham operators is very valuable to us in our attempt to get to injured patients in a timely manner."

The 2000 race was much larger than the first race held in 1911, but the spirit remains the same. Ski-to-Sea continues to attract a strong following, thanks in part to the Mt Baker Amateur Radio Club and its members who help make this annual event possible.

WE'RE LOST!

By Charles Chapman, KB8SFR

I've been asked for an explanation. Who, or what is LOST?

For the answer you have to go to southwestern Michigan in the late summer of 1997 when John Chapman, KB8UWA, stopped by my house and suggested that we test some of the equipment that we had been acquiring for the Radio Amateur Civil Emergency Service (RACES). The idea was to set up portable stations on the fly in a variety of locations each week and operate a weekly net. Jim Gorka, N8JG, stopped by to visit about the same time and joined us in our first adventure.

With the cars loaded, we drove off and eventually ended up near Fort Custer along M-96. We set up several portable stations and

Art, NK8X (left), ARRL EC for Kalamazoo County with Captain Schull of the Kalamazoo County Sheriff's Department inside the Mobile Communications Center.

even managed to attract the attention (on the air) of Max Tittle, KB8YPZ, who joined us as well.

There wasn't much left of that summer, but we did manage to set up portable operations at Coldbrook County Park and Ft Custer State Park. It made us even more determined to improve our stations and let other hams know how much fun it was.

In 1998, we started our "tours" once more, this time with a RACES meeting at the Kalamazoo County Sheriff's Department. Group members were encouraged to bring their portable stations, and it turned out to be an amazing collection of ideas and possibilities.

The rest of that summer could be described as a tour of our portable operations among the Kalamazoo County Parks. The one thing that sticks with me the most about that tour was the warm welcome and encouragement given to us by every park ranger and county employee that we encountered. Art Snapper, NK8X, began accompanying us on these excursions as net control and the number of participants grew.

The Mobile Communications Center for LOST is owned by the Kalamazoo Amateur Radio Club.

LOST members Charlie, KB8SFR, and Avery, K8ALP, at the MS Walk.

In the summer of 1999, with a great group of new hams and a solid core of holdovers, we embarked on an aggressive tour of most of the outlying fire departments. Soon, an identity for the club was developed: LOST—Line of Sight Team. Within a short time, the club call sign, KC8MUW, was assigned, and it could be heard regularly on Wednesday nights from some corner of Kalamazoo County!

By looking over last year's schedule of outings, LOST participated in a number of public-service events. We were involved in SKYWARN training, walk-a-thons, a Kalamazoo County disaster drill, community festivals and ARRL Field Day. The radio amateurs of our community can be counted on for providing reliable communications for public events and emergencies, and we're looking forward to summer 2001. QST

Field Organization Reports

Public Service Honor Roll
January 2001

This listing is to recognize amateurs whose public service performance during the month indicated qualifies for 70 or more total points in the following 8 categories (as reported to their Section Managers). Please note the maximum points for each category: 1) Checking into a public service net, using any mode, 1 point each; maximum 60. 2) Performing as Net Control Station (NCS) for a public service net, using any mode, 3 points each; maximum 24. 3) Performing assigned liaison between public service nets, 3 points each; maximum 24. 4) Delivering a formal message to a third party, 1 point each; no limit. 5) Originating a formal message from a third party, 1 point each; no limit. 6) Serving as an ARRL field appointee or Section Manager, 10 points each appointment; maximum 30. 7) Participating in a communications network for a public service event, 10 points each event; no limit. 8) Providing and maintaining an automated digital system that handles ARRL radiogram-formatted messages; 30 points. Stations that qualify for PSHR 12 consecutive months, or 18 out of a 24-month period, will be awarded a certificate from HQ on written notification of qualifying months to the Public Service Branch at HQ

790
NM1K
443
K9JPS
344
N9VE
332
NC4ML
283
WA5OUV
279
W7BO
278
KV4AP
251
N5JZ
233
W7TVA
232
KK5GY
218
KA2ZNZ
214
K7VVC
204
N5OUJ
202
KK3F
AG4DL

198
WB5ZED
N5IKN
KB2RTZ
193
WD8V
192
NN7H
191
N2LTC
189
WA9VND
187
N2GJ
186
W4ZJY
185
KC8LBZ
184
KA4FZI
182
WO0A
181
KB2EV
178
K9FHI
174
W8YS

173
KB1DSB
172
WB2UVB
K2UL
171
W6DOB
KC2AHS
N2RPI
KB2VRO
170
W6IVV
169
KC5OZT
168
W4EAT
KA2GJV
K6YR
165
KB1AJ
W5ZX
164
W0OYH
163
W2EAG
N8IO
WA5I
162
WB5NKC
WB4GM

WX8Y
160
KC8CON
159
K0IBS
158
KB8ZYY
W6QZ
156
KB0RUU
155
N9KNJ
N2OPJ
154
KC4TLG
K8GA
153
W4CAC
152
NR2F
151
N7YSS
149
N2CCN
148
W3YVQ
KC4ZHF
KD4GR
AD6LW

147
WA4DOX
W0WWR
K4SCL
146
N1LKJ
145
N8BV
AA3SB
144
KB2KLH
N2JBA
WB2ZCM
143
AF4NS
WA1FNM
N5NAV
W5GKH
142
NZ1D
KA1GWE
N3WKE
KC2EOT
141
WB5NKD
N3ZKP
KT4PM
140
WD4JJ
W0LAW
KA2CQX

139
W2MTA
K4RBR
W7ZIW
138
KE4JHJ
N0SU
W4NTI
KT6A
W7GB
N2KPR
N2WDS
NY2V
N9BDL
WD9FLJ
N2YJZ
WD8DHC
137
W3VK
W2RJL
AB4XK
136
KK1A
WB4TVY
KO4A
135
AC4CS
134
W3BBQ
W3CB
N2AKZ
KC2DAA
AD4IH
132
KC7ZZB
KI4YV
131
W9CBE
130
KC7SRL
WB0ZNY
WA0TFC
W9YCV
KB5TCH
129
WU4C
W4DGH
WA4QXT
WA2UKX
K9LGU
128
KW1U
K5IQZ
NN2H
WB2QIX
KB2VVB
WB2FGL
WX4H

127
K4FQU
126
W5CDX
WB2GTG
125
WA1JVV
AA2SV
123
W1QU
KJ3E
W2AKT
124
W1PEX
123
W1ALE
N3SW
W1QU
W7QM
122
KD1LE
K5DPG
121
W3IPX
K2DN
N9TVT
W7LG
W7GHT
120
K0PIZ
N3WAV
K7MQF
KF6OIF
119
K4YVX
N3YSI
118
W4WXA
N7DRP
N8DD
W4CKS
K4MTX
K9GBR
N3EFW
K7GXZ
KA2DBD
KA8WNO
K5NHJ
117
K1FP
N1BJD
AD4XV
N1JBD
KG2D
W2FR
WW8D
116
W3HK

KA2BCE
W5AYX
115
KB0DTI
N7AIK
AF2K
K8KV
WA2YBM
KE4JFS
KJ4N
KJ7SI
114
WB7VYH
N9MN
113
WA1QAA
AA3GV
WD0GUF
K2PB
112
AG9G
KA9EIZ
111
W1JX
WI2G
110
W1JX
AB4E
K8PJ
KO4OL
109
K8VFZ
108
K4WKT
AA4YW
WA4EIC
W2MTO
107
K5MC
K8LEN
W3NNL
WR8F
KM5VA
N3RB
106
W8SZU
N8EXV
KF4KSN
105
K8QIP
WA8SSI
KB2WII
WA2GUP
K1JPG
104
W2PII
KE4EZQ
K2VX

103
KV4AN
KE4GYR
WB2LEZ
KC6SKK
102
WB4UHC
KB2VVD
W6JPH
KB4DXN
101
KA4HHE
K4BEH
W1JTH
N3WK
WA4GLS
W3IVS
W1JTH
WA8DHB
99
K8PJ
98
W9ZY
KE0K
W4AUN
97
KC7SGM
W4CC
N8OD
96
KA8VWE
WB4PAM
KF5A
KC6NBI
95
W4QAT
W2LC
WB2IJH
KG4CHW
94
KC8HTP
N7CEU
KR4MU
WB4ZNB
K3UWO
93
KG5GE
91
KG4FXG
K8AE
89
KD4HGU
88
K3TX
AA4BN
87
K8ZJU

86
KA2ZKM
KA1VED
KC3Y
KA2ZKM
85
N1IST
KE4PAP
W0FCL
KC2ANN
84
KE3FL
83
K1SEC
KF4NJP
KE4VBA
82
W5PY
KT4TD
WB9GIU
N4JAQ
WA4EYU
81
W2CC
80
WA2YOW
79
KE4DNO
78
N4CQR
77
W7VSE
WA2EDN
76
N1LAH
75
KM5YL
K3CSX
74
K1YLB
KB4WBY
73
W7EP
W4SEE
KE4WBI
72
WA4CSQ
71
K1STV
AC5Z
KM4WC
70
KC2GVL
KA7TTY

The following stations qualified for PSHR during the months indicated, but were not previously recognized in this column: (Nov) KA8VWE 111. (Sep) KA8VWE 75 (Dec) N2LTC 191, N8GG 88.

Section Traffic Manager Reports
January 2001

The following ARRL Section Traffic Managers reported: AL, AR, AZ, CT, EMA, ENY, EPA, EWA, GA, IA, ID, IL, IN, KS, KY, LA, MDC, ME, MI, MN, NC, NFL, NH, NNJ, NNY, NTX, OH, OK, OR, ORG, SBAR, SD, SDG, SFL, SNJ, STX, TN, VA, WCF, WMA, WNY, WPA, WI, WVA, WWA, WY.

Section Emergency Coordinator Reports
January 2001

The following ARRL Section Emergency Coordinators reported: AZ, CT, ENY, EWA, IN, KS, KY, LA, MI, MN, MO, NFL, NLI, SD, SFL, STX, SV (North), TN, VA, WCF, WMA, WNY, WY.

Brass Pounders League
January 2001

The BPL is open to all amateurs in the US, Canada and US possessions who report to their SMs a total of 500 points or a sum of 100 or more origination and delivery points for any calendar month. All messages must be handled on amateur frequencies within 48 hours of receipt in standard ARRL radiogram format.

Call	*Orig*	*Rcvd*	*Sent*	*Dlvd*	*Total*
NM1K	681	313	795	7	1796
KK3F	22	636	594	42	1294
N2LTC	0	599	640	23	1262
W5SEG	0	529	665	15	1189
W7BO	86	543	545	0	1174
K7VVC	65	464	529	24	1082
W1PEX	0	128	805	0	933
WB5ZED	17	476	405	13	911
KT6A	0	363	364	0	727
K9JPS	0	339	39	337	715
W6DOB	0	369	260	33	662
W9IHW	3	318	86	250	657
WZ7V	0	346	27	280	653
W9YPY	0	305	336	0	641
W6IVV	12	252	322	0	586
KA2ZNZ	10	275	214	70	569
N9VE	2	251	37	252	542
WA9VND	3	326	201	9	539
N1LKJ	3	271	234	15	523
WB2GTG	2	202	311	6	521
N5IKN	0	255	105	150	510
KW1U	0	278	213	10	501

BPL for 100 or more originations plus deliveries: WD9GNK 232, K9GU 226, WA5OUV 159, KK5GY 114, N5JZ 113. The following station qualified for BPL in December 2000, but was not listed in this column last month: N2LTC with 2009 points.

QST

How's DX 2001 Survey Results

The results of the How's DX 2001 Survey are now in. A total of 1409 Amateur Radio operators submitted valid ballots. There were 150 invalid (incomplete) ballots that had to be discarded. These were all on-line ballots, so there are no dimpled or hanging chads to examine. I will not put the DX community through another recount!

So, without further delay, let's take a look at each question along with the results and comments from your editor.

1. How long have you been licensed?

Less than one year	9	0.6%
1-5 years	71	5.0%
5-20 years	306	21.7%
20 or more years	1023	72.6%

There's no question about it—we have some very seasoned operators and we need new blood in both Amateur Radio and in the DX community. What are you or your club doing to promote DXing to potential enthusiasts? Write in and let me know some of your ideas that I can share with everyone else.

2. How many DXCC entities have you worked?

Less than 100	197	14.0%
100-200	250	17.7%
200-300	359	25.5%
300-325	226	16.0%
326+	377	26.8%

Currently there are 334 entities on the DXCC list. More than 1/4 of our readers are on the DXCC Honor Roll. This is no surprise, but it is not the end of the line because DXers can participate in the DXCC Challenge while waiting for those last few (see the DXCC Challenge article elsewhere in this issue).

3. How old were you when you were first licensed?

less than 15	298	21.1%
15-30	688	48.8%
31-50	342	24.3%
51-80	80	5.7%
81 or older	1	0.1%

Next time I'll change the age spread because there was a majority licensed between 30 and 15, and not many from 51 and up.

4. What is your current age?

less than 15	3	0.2%
15-30	32	2.3%
31-50	346	24.6%
51-80	977	69.3%
81 or older	51	3.6%

Wow, are we getting old! It's not new news that we need to get some young people involved in our hobby.

5. What is your sex?

Male	1388	98.5%
Female	21	1.5%

This one is a no-brainer. You don't hear many YLs in the pileups.

6. What is your current license class?

Novice/Technician	17	1.2%
General	154	10.9%
Advanced	112	7.9%
Amateur Extra	975	69.2%
non-US license	151	10.7%

We shouldn't be surprised about this number now that the code exam has been lowered to 5 WPM. I think we are going to see fewer DXpeditions listening up for General licensees in the future. Now is the time to upgrade your license and have access to more DX!

7. Do you have e-mail?

Yes	1316	93.4%
No	93	6.6%

8. Do you have access to the Internet?

Yes	1319	93.6%
No	90	6.4%

Virtually everyone who participated in the survey has e-mail and can get on the Internet. If you are not on the Internet, you are missing a great way to keep up with our hobby!

9. How much time (average) do you spend on the air each week?

less than 1 hour	131	9.3%
1 to 5 hours	599	42.5%
6-10 hours	399	28.3%
more than 10 hours	280	19.9%

10. What modes are you actively chasing DX on?

CW	960	68.1%
SSB	1153	81.8%
RTTY	219	15.5%
PSK31	131	9.3%
SSTV	10	0.7%
Other	30	2.1%

It's good to see that almost 70% of our readers are actively chasing DX on CW. Look how fast DXers are picking up on PSK31! Could it someday beat out RTTY?

11. What bands are you actively chasing DX on?

6	161	11.4%
10	1223	86.8%
12	684	48.5%
15	1188	84.3%
17	754	53.5%
20	1239	87.9%
30	509	36.1%
40	875	62.1%
80	633	44.9%
160	282	20.0%

Obviously, a lot of DXers have the traditional triband antennas for 10, 15 and 20 meters. Look how low 30 meters ranked; this is a DXer's secret weapon band. There aren't many chasing DX here and many DXpeditions operate this band. Over the next 4 to 5 years, watch for more activity on the lower bands as we slide down the solar cycle.

12. Do you chase band countries?

Yes	746	52.9%
No	663	47.1%

13. Do you chase mode countries?

Yes	584	41.4%
No	825	58.6%

Several people asked what it means to chase band and mode countries. In simple terms, there are DX enthusiasts who work as many countries as possible on particular bands, or by using particular modes. For example, I've worked Syria on 10 through 160 meters *and* on CW, SSB and RTTY. Is it possible to work every country on each of the modes? Yes, but no one has done it yet. What about every country on every band? Possibly, but not likely in this lifetime.

14. Do you use a computer for logging?

Yes	740	52.5%
No	669	47.5%

The number of amateurs who utilize computer logging is a lot lower than I would have guessed. Computer logging programs sure come in handy when you go to do your QSLing and award hunting!

15. Are you a member of the ARRL?

Yes	1336	94.8%
No	73	5.2%

16. Are you a member of a DX club?

Yes	435	30.9%
No	974	69.1%

I am surprised that the number of DX club members is so low. DX clubs are a great resource. DX club meetings are a great place to meet others who are actively chasing DX and to learn more about the how, where and when of DXing.

Bernie McClenny, W3UR ♦ 3025 Hobbs Rd, Glenwood, MD 21738-9728 ♦ w3ur@arrl.org

17. Are you a member of a general interest ham club?

Yes	792	56.2%
No	617	43.8%

18. Have you ever worked a DX station on a list or net (be honest)?

Yes	950	67.4%
No	459	32.6%

Thanks for being honest on this one. More than a couple of people said they would get on a list or net to work a new country, even though they do not care for this type of operation.

19. How high is your highest antenna above ground?

less than 10 feet	43	3.1%
11 to 50 feet	791	56.1%
51-99 feet	481	34.1%
100 feet or more	94	6.7%

20. What is the most power your station is capable of running?

up to 100 W	447	31.7%
100-499	193	13.7%
500-999	265	18.8%
1000-1500	414	29.4%
more than 1500 W	90	6.4%

Almost a 1/3 of our readers are running less than 100 W. A few people mentioned the most their station is capable of running is QRP. We will have that as a choice next time.

21. How old is your rig?

less than 1 year	167	11.9%
1 to 5 years	537	38.1%
5-10 years	374	26.5%
more than 10 years	331	23.5%

22. How would you best describe your rig?

top of the line	504	35.8%
good	789	56.0%
so-so	69	4.9%
time to be replaced	47	3.3%

It seems that most of those who participated in the survey are satisfied with their rigs, despite how old the equipment may be.

23. How would you best describe your antenna(s)?

monobander	139	9.9%
multiband Yagi or quad	727	51.6%
vertical	222	15.8%
dipole	208	14.8%
other	113	8.0%

24. Do you own an amplifier?

Yes	926	65.7%
No	483	34.3%

25. Do you own a tower?

Yes	897	63.7%
No	512	36.3%

26. What Amateur Radio magazines do you subscribe to?

QST	1343	95.3%
CQ	514	36.5%
WorldRadio	285	20.2%
Others	277	19.7%
No response	16	1.1%

27. Which DX bulletins do you read (circle all)?

425 DX News	431	30.6%
ARRL	1027	72.9%
OPDX	420	29.8%
DailyDX	175	12.4%
QRZ DX	216	15.3%
599	145	10.3%
No response	184	13.1%

28. How often do you read How's DX?

Never	190	13.5%
Sometimes	267	18.9%
Most of the time	277	19.7%
Always	675	47.9%

29. If someone were to ask what is your main interest in Amateur Radio, what would you say?

General interest	259	18.4%
Contesting	96	6.8%
DXing	904	64.2%
Ragchewing	71	5.0%
Public service	45	3.2%
Other	34	2.4%

30. Have you ever read a book about DX?

Yes	860	61.0%
No	549	39.0%

31. How much money do you spend per year on Amateur Radio?

less than $500	729	51.7%
$500-$2499	605	42.9%
$2500-$5000	61	4.3%
$5000 or more	14	1.0%

32. Have you ever operated Amateur Radio outside of your country?

Yes	634	45.0%
No	775	55.0%

33. What country do you live in?

Most of our readers are from the US (1150 [81.6%]). Some of the other countries represented in the survey include: United States Territories (46); Canada (33); Germany (17); United Kingdom (13); Croatia (8); Italy, Japan (7 each); Taiwan, Finland, Sweden (5 each); France, Norway (4 each); Israel, Chile, Switzerland, Denmark, Brazil (3 each); Ireland, Belgium, Poland, Russia, New Zealand, China (2 each); Portugal, Spain, Colombia, South Korea, Argentina, Czech Rep, Netherlands, Australia, Indonesia, Uruguay, Philippines, Austria, Aruba, Sri Lanka, Slovenia, Mexico, Romania, Yugoslavia, South Africa (1 each); plus several other countries that were not listed.

How's DX 2001 Survey Conclusions

To sum it up, the average reader of How's DX is an American male who was first licensed as a teenager more than 20 years ago. He is just about to retire, has just over 300 countries, has been known to work a new country on a net or list and is an Amateur Extra licensee. Our DXer averages about 5 hours a week on the air, is active on the Internet and operates both CW and SSB. He chases band countries, not mode countries, logs the QSOs in his computer and is mostly active on 10, 15, 20 and 40 meters. The average reader is a member of the ARRL and a general interest club, but not a DX club. His station consists of a somewhat good-conditioned radio that is about 5 years old. A tower just under 50 feet is used along with an amplifier that generates just over 500 W into a multiband Yagi or quad antenna. Our reader enjoys How's DX, has read a book about DXing, reads the ARRL DX Bulletin and one other DX bulletin. His main interest in the hobby obviously is DXing. He spends under $2000 annually on Amateur Radio and has not been on the DX side of the pileup.

I hope you find this survey as interesting as I did. A lot of time was spent tabulating the manual data. Next time I believe I'll make it an on-line-only survey to save time. Thanks to Christa, my daughter, for all her help entering the survey ballots.

VISALIA INTERNATIONAL DX CONVENTION 2001

The Kingman Reef (K5K) and Comoros (D68C) DXpeditions will be the featured programs at the International DX Convention 2001 in Visalia, California, this month. Garry Shapiro, NI6T, and Tom Harrell, N4XP, of the Kingman Reef 2000 team will co-present their program at the Saturday evening banquet. Then Neville Cheadle, G3NUG, team leader of the D68C Comoros DXpedition, will be featured at the Sunday breakfast. Both are expected to be exciting programs about two successful DXpeditions.

The Convention will take place April 20-22, 2001 at the Holiday Inn in Visalia, California. It is an ARRL sanctioned event and will be attended this year by ARRL President, Jim Haynie, W5JBP, who will also make a few comments at the Saturday banquet.

Additional information is available on the Convention Web page. Just surf over to **www.ncdxc.org** and follow the Convention links. Registration information is available by contacting Dick Letrich, W6KM, at **dlw6km@aol.com**.

World Above on the WWW

Surfing the Worldwide Web for information about the world above 50 MHz has become as popular as tuning across the bands. You can watch openings as they unfold by clicking onto an on-line DX spotting site, follow the MUF on real-time ionosondes or observe aurora develop over the poles from current satellite photographs. Some VHFers are even suspected of spending more time on the Web than on the bands.

Sorting out the WWW

Thousands of Web sites have information useful to the "World Above 50 MHz" (WA50) crowd. Commercial search engines make it easy enough to find most sites on your own using obvious key words. Experienced Web surfers bookmark their favorite pages into thematic files for easy retrieval. Many Web sites provide lists of useful links that can make the search less chancy and more convenient.

Indeed, the variety of Web sites is astonishing. Radio societies, clubs and individuals maintain hundreds of WWW pages alone. Several international DX-spotting sites specifically keyed to the VHF bands can be found on the Web, as well as propagation loggers and chat rooms. Several sites provide QSL addresses, managers and DXpedition information. Amateur and professional Web pages provide a wealth of information about propagation, including data on solar, geophysical, ionospheric and tropospheric conditions. All the major equipment manufacturers and distributors have Web sites, which in addition to making on-line purchases easy, provide a wealth of useful information. Even the WA50 has finally gotten into the act with a series of pages on the ARRL Website.

Only a small number of Web pages can be mentioned in this brief introduction. The goal is to suggest a few selected sites that can provide gateways to the many pages on the great WWW, especially if you are still newcomer to this world. Follow the links! It might even be possible to start with just a single site, such as the excellent *Amateur Radio Information*, and get to any other Web site with VHF-and-higher information by following the suggested links. URLs for the sites discussed here appear in Table 1.

Table 1
URLs for Gateway Web Pages

Amateur Radio Information	www.btinternet.com/~geoffrey.brown3/
A Domain for Microwave Amateur Radio	www.wa1mba.org/
Ham-Links	www.k1dwu.net/ham-links/
North East Weak Signal Group	uhavax.hartford.edu/~newsvhf/welcome.html
North Texas Microwave Society	ntms.org
Open Directory Project	www.dmoz.org/Recreation/Amateur_Radio/VHF/
RSGB Propagation Studies Committee	www.keele.ac.uk/depts/por/psc.htm
Solar Terrestrial Dispatch	solar.uleth.ca/main.html
Space Environmental Center	www.sec.noaa.gov/
SpaceWeather	www.spaceweather.com/
UK Six Metre Group	www.uksmg.org/link.htm
VHF+ Newsletters	www.umecut.maine.edu/~baack/vhfnewslist/
Welcome to the World Above 1000 MHz	www.geocities.com/SiliconValley/Vista/7012/ghz.htm
World Above 50 MHz	www.arrl.org/qst/worldabove/

General Amateur Radio

Several sites provide comprehensive gateways to the variety of pages with Amateur Radio interest, including VHF and higher. *Ham-Links* by K1DWU maintains more than 4500 links neatly organized into 70 or so categories, such as Aurora, EME, Six Meters, Space, SSTV and VHF clubs. The *Open Directory Project* has a single alphabetical list of several-hundred links on its Amateur Radio-VHF page, many from other countries.

Specifically for VHF and Higher

Amateur Radio Information, produced by Geoff Brown, GJ4ICD, provides a most extensive array of easy-to-use links to VHF sites around the world. It is easy to click on various DX spotting sites, current solar and propagation data, equipment information and building notes, national organizations, equipment dealers, QSL information and related sites.

The *North East Weak Signal Group* pages provide general information on beacons, operating events, grid locators, hill topping, operating practices, software and equipment. Follow the link to WZ1V's comprehensive list of hundreds of other VHF related Web sites.

A convenient list of US newsletters and club information can be found at *VHF+ Newsletters*. Many additional club pages and newsletters, especially outside the US, can be found on several of the more general sites mentioned above.

Six Meters

The *UK Six Metre Group* provides one of the best single sources of information concerning 50-MHz operating. Go to this site for gateways to DX spotting sites, latest operating news, propagation, six-meter "first" lists, newsletters, other organizations and a variety of original pages devoted to equipment and operating.

Microwaves

The *North Texas Microwave Society* home page provides a list of links to information on beacons, equipment, suppliers, EME information, standings, publications and many other sources of microwave information.

A *Domain for Microwave Amateur Radio*, maintained by Tom Williams, WA1MBA, is another great gateway into microwave building and operating. *Welcome to the World Above 1000 MHz*, by

This Month

April 20-21	Southeastern VHF Society Conference (Nashville, TN)
April 9	144 MHz Sprint, 7-11PM Local
April 17	222 MHz Sprint, 7-11 PM Local
April 25	432 MHz Sprint, 7-11 PM Local
April 28	European World-Wide EME Contest (144 MHz, 1.3, 10 GHz)

Emil Pocock, W3EP ♦ Box 100, Lebanon, CT 06249 (Voice 860-642-4347, fax 860-594-0259) ♦ w3ep@arrl.org

Peter Day, G3PHO, is oriented toward microwave experimentation and also has a number of excellent links.

Propagation

The Propagation Studies Committee of the Radio Society of Great Britain site must have the most extensive list of links to amateur and professional Web pages concerning HF-through-microwave propagation currently running. From this one site, you can link to the dozens of sources of information on every conceivable propagation mode, real-time data of all sorts worldwide beacon lists, propagation-prediction programs and many other sorts of information.

Many government agencies and university research departments, as well as radio, solar and geomagnetic observatories, have Web sites useful for VHFers. NOAA's *Space Environmental Center* provides real-time solar and geophysical data in easy-to-use graphic form, data archives, prediction pages, news, background information and related services. These are perhaps the most authoritative pages for solar-geophysical phenomena.

Solar Terrestrial Dispatch, maintained by Canada's University of Lethbridge, offers a number of pages devoted to monitoring the state of the sun and its effects on Earth. *SpaceWeather* provides daily science news and information about the Sun-Earth environment. It also has a short list of key sites that deal with solar and geomagnetic conditions, aurora, comets and related phenomena.

World Above 50 MHz

The ARRL Web has added more pages that focus on VHF and higher operating. Go to the WA50 page for links to the complete Standings Boxes, EME Annals and DX records, which appear periodically in the column. Additional links lead to the new *US Six-Meter Firsts* and the *Grid Chase* pages. Do you have any suggestions for additional pages?

US Six-Meter Firsts is a list of all the DXCC entities worked on 50 MHz from the continental 48 United States. It shows the calls of the DX and US stations making the initial contact, the date and time. As of February 1, US stations have con-tacted 198 DXCC entities. This list formerly resided on GJ4ICD's *Amateur Radio Information* site, for which I am grateful. Look for links to at least two dozen other six-meter first lists for other countries.

The *Grid Chase* chronicles the VHF-UHF Century Club leaders by band. This list is compiled from *QST's* bimonthly reports of new VUCC members and endorsements issued. The top dozen stations on 50 MHz, for example, have all made confirmed contacts in 700 other grids, and over 1100 other 6-meter stations have confirmed at least 100 grids to earn an initial certificate. Astonishingly enough, more than 100 stations have already earned VUCC on 10 GHz, with the leaders making contacts with other 40 grids.

ON THE BANDS

January is normally one of the slowest months for VHF and higher activity, but this January must have been one of the slowest ever. Despite expectations for worldwide 6-meter DX, heightened possibilities of auroral activity and the second half of the winter sporadic-E season, there were few reports of unusual activities of any sort. Ordinary single-hop sporadic-E openings did make brief appearances on several days, but there were no widespread aurora openings, and 6 meters did not open even once for transatlantic contacts. Dates and times for the brief summaries are UTC, as always.

Six Meters

Six meters did not live up to expectations, primarily because solar activity was depressed. The solar flux exceeded 180 only one day (January 13), and geomagnetic conditions were unusually quiet throughout the month. Therefore, intercontinental DX in most parts of the world declined dramatically from December's levels. Most of the contacts that did take place were over the easier north-south paths.

Julio Medina, WP4LNY, for example, worked many LU, CX, PY and CE stations on half a dozen days during the month, but no continental US station reported even this much. Jon Jones, N0JK, noted that stations scattered from New York to Tennessee, Oklahoma and Texas heard the HC8GR beacon on the morning of January 27. VE9AA reported PY0FF after 1730 that same morning, but that is about it for reports of 6 meter DX from North America.

Other predominantly north-south paths in the Far East and from Europe to Africa remained active, but there was little new to report. Europeans found 6W1QU (Senegal), D68BT (Comoros) and ET3VSC (Ethiopia) among the normal fare of stations, but even they were hurting for DX. Other than the expected resurgence in north-south and long east-west paths adjacent to the equator in early spring, this may be have been it for Cycle 23.

Feedback

In response to an item in the February column, Russ Bentson, K6KLY, reported that he and others in the San Francisco Bay area worked FG5BG on November 29 around 1715, a day before those in Southern California.

Paul Smit, ZS6PJS, provides some further details about South African contacts to the US and Canada during October and November. On October 28, Paul and at least half a dozen other ZS stations worked VE1YX and VE1ZZ between 1350 and 1405. At 1519, ZS6PJS worked K1DAM. On November 6, ZS6PJS logged K1TOL, K8MFO, W8PAT, W8TN, N3II, W9ZR, K0FF, N4MM and W1JJM between 1418 and 1518. Paul believes the only other South Africa-to-US contacts took place on November 9, when he worked K1DAM again and K1SIX.

Ed Fitch, W0OHU, provided information on another 2-meter aurora beacon after reading the February column. KA0EWQ (EN15) runs 10 W to a three-element Yagi pointed north. Ed has used it for the past three years to catch early warnings of aurora.

The March column's "On the Bands" reported that W1ERZ made some aurora contacts on December 12. The date should have been November 29.

World 50-MHz Country Leaders

Six-meter DXers around the world added to their tally of countries worked as Cycle 23 reached its peak. PY5CC broke the 200-country level not long ago and others are not far behind. More than 150 DXCC entities are now needed to make the top-20 list of countries worked on 6 meters.

The Table 2 shows the leading 20 stations, as of February 1, and their total countries worked and confirmed. Europeans occupy 17 of those spots, and nine of those stations hail from the UK and the Netherlands alone. Is northwestern Europe really the 6-meter hotspot? The leading US stations have between 120 and 140 countries worked.

January VHF Contest

Conditions were average for the annual January VHF contest, which means they were generally poor. Six-meter operators caught fleeting sporadic-E openings across the Midwest and from Florida to the Northeast, mostly on Sunday. There were auroras across the northern US and southern Canada during the final three hours of the contest, but relatively few operators seemed aware of it. Rover activity was down throughout much of the Northeast because of snow and ice.

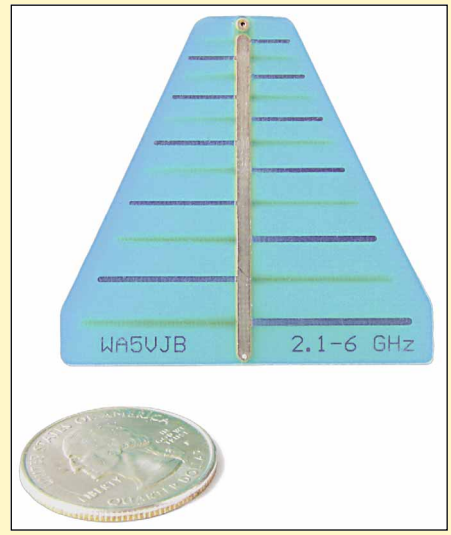
Nevertheless, the turnout was good and many commented on how well stations spread out, especially on 6 meters. From the first hour of the contest to the last hour, stations could be found calling "CQ contest" from 50.127 past 50.170 MHz, at least in populated areas. Crowding around 144.200 MHz remained a

Table 2
DXCC Leaders on 6 Meters

	DXCC Entities	
Call	**Worked**	**Confirmed**
PY5CC	200	192
9H1BT	194	182
SV1DH	193	185
PA0HIP	181	175
GJ4ICD	176	167
ON4KST	175	167
ON4GG	174	167
9H1PA	170	163
G3WOS	169	156
DL7AV	168	160
SV1EN	165	156
SM7FJE	165	159
JA4MBM	164	157
G0JHC	163	155
PA2VST	162	161
JR2HCB	159	156
PA7FF	155	155
G4CCZ	156	147
G3KOX	153	148
PA5EA	152	150

Source: **www.btinternet.com/~geoffrey.brown3/50top.html**

PC Band Microwave LPDA



This clever 2.1- to 6-GHz PC-board log periodic (PCB-LP) Yagi is from Kent Britain, WA5VJB. Its diminutive 11 elements provide 6 dBi average gain over three amateur bands. The missing strip-line elements are hidden from view on the other side of the board. The Yagi works best when fed with 0.085-inch semi-rigid coax or similar miniature Teflon-dielectric coax. Kent suggests the PCB-LP anten-na might work well as a multiband feed for a small dish in the 0.3 to 0.35 f/d range, but you can probably think of other uses. Performance would be better with single-frequen-cy feeds, but this is sure convenient. It can probably take 50 W or so for short periods at 2304 MHz and perhaps 10 to 20 W at 5760 MHz. Kent has a similar PCB-LP antenna that covers 900-2600 MHz. For more information, contact Kent at **wa5vjb@flash.net**.

problem, although many rovers chose to operate above 144.230 MHz to increase their chances of being heard.

CALLING FREQUENCIES

VHFers in all parts of the country have commented favorably on the reduced crowding around the calling frequencies over the past two or three years. When DX was likely on 6 meters this past winter, for example, rarely did any US station call CQ on 50.110 MHz. Each active US DXer seemed to have a favorite frequency—somewhere between 50.085 and 50.120 MHz—for calling CQ and running whatever DX was available. Consequently, it was possible to hear real DX stations on 50.110 MHz when they first appeared. To their credit, most DX stations moved to another frequency once they understood the band was open.

The same habits will serve equally well for the domestic calling frequencies this summer. When 6 meters opens with strong sporadic-E signals, there is no point to putting out a call on 50.125 MHz, whether or not the frequency appears occupied. You will have a much better chance of finding a clear spot somewhere else in the band, as it is nearly a sure thing someone is already using 50.125. If you are intent on using a calling frequency when activity is low, at least try 50.200 MHz. The habit has been catching on. More stations have been moving way up the band, especially those that run low power.

The situation on 2 meters may not be quite as good in some areas of the country. Despite the improvements, the abuse of 144.200 MHz is still so notorious that anyone hoping to pull out a weak signal would do better to operate anywhere else, even when the band seems dead. This may also be a good time for CW operators to get back into the habit of using 144.110 MHz as a starting point of activity, especially when aurora or ducting is suspected. Even at 222 and 432 MHz, calling frequencies may not always be the best places to stir up activity, especially if you are looking for weak and distant signals.

Operators in low-activity areas have countered that they will never be heard unless they call CQ on the calling frequency. This is nonsense. It is more likely that your weak signals will be buried by distant QRM on the calling frequency than any other nearby frequency you could choose. Countless DX QSOs have been lost because the contacts were attempted on a calling frequency. Spread out and be heard!

It is a worse abuse to call CQ on a calling frequency and announce that you are "listening for calls 10 kHz up the band," or something similar. Some 6-meter operators are not content to do this just once, but jump back to the calling frequency after each QSO! It was quite astonishing to hear several stations doing this simultaneously on 50.125 MHz. Perhaps they think the calling frequency is the *only* place where CQs are allowed. This poor operating practice is no improvement over making a series of QSOs right on the calling frequency. If you want to make contacts "10 kHz up the band," then call there from the start. They will find you!

Radios have tuning knobs. Encourage your fellow operators to tune around, rather than monitor a single frequency as if it were an FM repeater. If it is too much effort to turn the knob yourself, program your rig to scan across the popular portion of the band. There are simply no excuses for sitting on calling frequencies.

VHF/UHF/MICROWAVE NEWS

VHF/UHF Sprints Sponsored by the East Tennessee DX Association

The East Tennessee DX Association (ETDXA) has taken on the task of sponsoring a series of spring VHF-UHF sprints for the second consecutive year. Separate sprints for 144 through 432 MHz are scheduled for consecutive weekends in April (see "This Month" at the beginning of the column for the dates and times). The microwave sprint covers all bands at 902 MHz and higher and will be held on Saturday, May 5, from 6 AM to 1 PM local time. The 50-MHz event takes place on May 12-13, 2300 UTC until 0300 UTC.

Exchange grid locators. Total score is number of contacts times grid locators worked. Rovers may accumulate their grids and contacts worked from each different grid they activate. There is only one entry category. Send paper or electronic logs no later than a month after the close of each event to ETDXA, 1620 Hidden Hills Dr, Clinton TN 37716, or to **vhffdx@etdxa.org**. Check the ETDXA Web site at **www.etdxa.org** for complete information.

North-American High-Speed Meteor-Scatter Contest

Robert Brown, KR7O, announces a VHF high-speed CW contest to run from 0000 May 1 to 2359 May 9. Operate a maximum of 48 hours in blocks of no less than 30 minutes each on any band above 50 MHz. All contacts must use CW at no less than 99 WPM (495 letters per minute). Certain operating procedures are required. There are four single-operator entry classes, and scoring is based on band and on whether contacts were random or assisted. For details, visit **www.vhfdx.com**. For a printed copy of the rules, send an SASE to Steve Harrison, K0XP, 7 Well Ave, Danbury, CT 06810.

EUROWINLOG

Claus Neie, DL7QY, has written a *Windows*-based logging program especially designed for VHF operators. It is useable for all the bands from 50 MHz through 24 GHz and has provisions for handling all 32,400 grid locators worldwide. You can find additional information about *EUROWINLOG* at **www.eurowinlog.com**. QST

NEW PRODUCTS

MFJ BOOM MICROPHONE HEADSETS

◊ MFJ Enterprises now offers boom microphone headsets designed with DXing, contesting and net operation in mind.

The MFJ-396 Boom Mike Headphone feature dual full coverage foam-padded earpieces that are mounted on an adjustable padded headband. A flexible microphone boom allows optimum positioning of the mike element.

The 9-foot 8-inch cord is terminated in a 1/4-inch plug for receive audio and a 1/8-inch plug for microphone audio. Microphone jack adapters (sold separately) are available for a variety of transceivers.

The MFJ-394 Single Ear Boom Mike Headphone is very similar to the '396, but include a single padded earpiece.

Price: MFJ-396, $79.95; MFJ-394, $74.95; MFJ-5396Y/K/I microphone jack adapters, $15.95 each. For more information, visit your favorite Amateur Radio products dealer or contact MFJ Enterprises, PO Box 494, Mississippi State, MS 39762; tel 800-647-1800, fax 601-323-6551, **www.mfjenterprises.com/**. QST

Previous • Next New Products

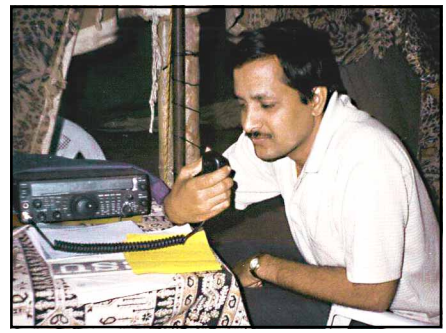
World Amateur Radio Day—April 18

In 1981, the International Amateur Radio Union (IARU) approved the proposal of the Liga de Amadores Brasileiros de Radio Emissao (LABRE), the IARU member-society for Brazil, that April 18 be designated World Radio Amateurs Day. In 1984, Fred Johnson, ZL2AMJ, of the New Zealand Association of Radio Transmitters (NZART) started the ball moving toward celebrating and promoting this event. Today, Fred is still actively promoting World Amateur Radio Day as both a Councilman and Officer in NZART, and as Chairman of IARU Region 3. NZART has a terrific selection of Amateur Radio promotional material on its Web site, including an animated Web "movie" small enough to be easily downloaded and used on other Web sites and presentations. The URL for the movie is **www.nzart.org.nz/nzart/promo/promoting/promoting.html**

Fred also points to an April 1984 *QST* editorial by David Sumner, K1ZZ, in which he is quoted concerning his NZART concept for World Amateur Radio Day. "This is not a contest, but an activity in which every radio amateur can take part and should be encouraged to do so. The idea is to recognize the founding of the International Amateur Radio Union on April 18, 1925, by doing something you have not done before, sometime between 1200 UTC on April 17 and 1200 on April 19 each year. These dates and times represent the start and finish of April 18 at the International Date Line, and are chosen to show the unification of all radio amateurs by observing the same period for this global activity."

Fred goes on to suggest that in 2001 all amateurs should use April 18 as "a time to look at our individual selves, at our reserves, at our stations, and at our preparedness and training to handle and to exchange command-and-control and health-and-welfare messages at a time of need when we and our communities are under severe stress."

The story of the horrific earthquake disaster in the Indian state of Gujarat, where an estimated 50,000 are dead and more than 600,000 are homeless, is a grim reminder to all of us about the need for community and personal preparedness for the unexpected. Amateur Radio operators involved in the Gujarat disaster performed commendably and proved the very real value of Amateur Radio in such a catastrophe. As the Gujarat disaster also proved hams have to be prepared not only to communicate, but to *survive* as well. Like the quake victims themselves, Amateur Radio volunteers in the region were sleeping in the open because of a lack of tents.



Indian amateurs played key roles in relief efforts after the devastating earthquake in the state of Gujarat.

The IARU's Administrative Council selected "Providing Disaster Communications: Amateur Radio in the 21st Century" as the theme for World Amateur Radio Day in 2001. The selection of this theme was based on two considerations: To assist in dispelling the notion held by some members of the public that technological changes have bypassed and diminished the future role of the amateur services, and to reaffirm the importance of Amateur Radio as a resource to help mitigate the effects of disasters by providing communications to aid humanitarian efforts.

Horey Majumdar, VU2HFR, says hams in Calcutta, where he lives, were able to locate and pass along information about the well being of several individuals. "However, the best option would have been to have our own team from Calcutta at Bhuj," he said. Majumdar was part of a team from Calcutta that responded in the wake of the cyclone disaster last year in Orissa. But, he lamented, "We do not have the funds nor the coordination with the local nongovernmental organizations to mount an operation of this scale in the earthquake zone."

"I think this incident epitomizes the key role played by ham radio after an incident of this magnitude," Majumdar said. "There must have been thousands of families like this." He said handling some of the health and welfare inquiries was tough for him, and he suspects other hams had similar experiences. In one case, he was contacted by the family of a technician at the Indian Air Force base in Bhuj. Via ham radio, he received the information from the quake zone, but it was not good news. "It was extremely difficult for me to convey to their family that this person, his wife and 7-month-old daughter didn't make it," Majumdar said. "Their house had caved in completely, and even their bodies could not be recovered." He said the man's relatives were, nonetheless, grateful to know what had happened.

BRIEFS

- Poland is now participating in the European Conference of Postal and Telecommunications Administrations' "CEPT radio amateur license." The CEPT radio-amateur license allows US amateurs to travel to and operate from many European countries without seeking a special license or permit. Under the CEPT Agreement, to activate operating authority, a traveler would have to carry credentials in English, French and German affirming their identity as a US citizen and a Commission-authorized amateur operator. See **www.arrl.org/FandES/field/regulations/io/#us** for more information.
- ARRL Amateur Radio Direction Finding Coordinator Joe Moell, K0OV, has announced the first US National Championships of Radio Direction Finding this summer. The Albuquerque Transmitter Hunters, part of the Albuquerque Amateur Radio Club, will host the event July 31 through August 4 in Albuquerque New Mexico. The championships are open to all ages at any level of foxhunting experience. Main events on 2 and 80 meters will feature five fox transmitters to be found in accordance with standard rules of the International Amateur Radio Union. Lodging, meals, and ARDF training will be available. For additional event information, visit the 2001 USA ARDF Championship Web site at **www.egroups.com/files/abqardf/web/index.html**. For general information on ARDF, visit Joe's "Homing In" Web site at **members.aol.com/homingin/**. The Chinese Radio Sports Association has announced that it plans to send a team to this event. Moell says the USA ARDF Championships are open to all ARDF enthusiasts, at any skill level, from any country.
- Japanese old timer Taroh Yagi, JH1WIX (ex J1ZB, J1DO, J2GX, AJ4ZZ), passed away on January 29 in the Toshiba Hospital. Mr. Yagi, who was 93 years old, was first licensed in 1924 and was a member of the ARRL, JARL, QCWA, FOC and Tokyo Old Timers Club. Amateur Radio has lost one of its finest pioneers. He was very active in the US Novice bands, giving many American amateurs their first QSOs with Japan. QST

Dave Patton, NT1N ♦ Special Assistant to the Executive Vice President

Impressions of the Elecraft K2 Transceiver

Timing is everything, as demonstrated by the phenomenal success of the Elecraft K2 transceiver kit. I seriously doubt that the K2 would have been such a success had it been introduced five years ago. The time was just not right. During the last five years, the QRP community has experienced an abundance of high-performance rigs designed by some really talented engineers. The ease of construction and the superior performance of these transceiver kits set the stage for the greatest QRP radio to ever be produced to date.

Wayne Burdick, N6KR (of Wilderness Radio fame), along with Eric Swartz, WA6HHQ, decided to collaborate on a CW/SSB transceiver kit. They called their new venture Elecraft. Their mission: to design, prototype, manufacture and market the most advanced QRP transceiver kit ever produced. The result was the K2. I can say unequivocally that they have achieved their mission goals.

From the start, Elecraft solicited comments from the QRP community on what was really needed in a top-of-the-line QRP radio. They created a team of "Beta Testers" that took the initial one hundred K2 kits, built and debugged them, and provided valuable feedback prior to the company ever selling to the public. This resulted in a much-improved kit that was virtually free of bugs and guaranteed to work first time, provided the instruction manual was followed precisely.

An in-depth product review of Elecraft K2 s/n 495 appears in March 2000 *QST*. Built by Larry Wolfgang, WR1B, and Zack Lau, W1VT, and tested in the HQ Lab, this review of K2 s/n 495 is a very definitive look at one of the hottest radios on today's market. Just last month *QST* also published a comprehensive review of the K2's little brother, the K1.

Despite the information that's already out there, I continue to receive quite a few requests for my opinion of the K2. This is as good a time as any to "hold forth" on the subject.

My Experience

My own K2 arrived in March and construction was completed in 30 hours. Outside of a couple of errors directly attributed to "operator headspace," the rig went together with no hassles. My K2 is the best radio I have ever owned and has become my station rig. It's accompanied

me on a couple of trips and performance has been flawless for both casual operation and contesting. Only a couple of problems have arisen. Both were traced to cold solder joints. In all instances, technical help is just an e-mail away. Elecraft maintains an active presence on their e-mail reflector. The factory technical support staff quickly answers any questions or problems you might encounter.

Since I am an analog dude in a digital world, I wanted to see how fast I could learn the intricacies of this rig *without* resorting to the manual. I set my new K2 on the bench and, by experimenting with the various push buttons and switches, I had the operation of the K2 down within 30 minutes. The K2 is ergonomically well designed and extremely easy to operate.

Receiver performance is amazing. I have been able to get within 300-400 Hz of "Big Gun" contesters and, with the IF filters cinched down, still copy and work much weaker stations. That is outstanding dynamic range! There are four filter selections available for SSB and CW. Dual VFOs plus RIT and XIT give the K2 total frequency agility. The keyer speed and RF power output are displayed as their respective controls are rotated. Operational settings can be modified on the fly via the **MENU** button.

A Word About the K2 Filters

The filter bandwidth and center frequencies are fully programmable via onboard software. Although the manual goes into detail about how to do this, the easiest way is to use a freeware program called *Spectrogram* (downloadable on the Web at **www.monumental.com/rshorne/gramdl.html**) and the sound card in your computer. After struggling for 3 weeks to properly align my K2's filters, Dave Carey, N3PBV, and I did the job using *Spectrogram* in about 10 minutes. The archives on the Elecraft e-mail list have all the details on this procedure.

QRP WebSurf

The *QRP WebSurf* takes us to Aptos, California: **www.elecraft.com**. Log onto the site and check the K2 out for yourself. The Elecraft Web site has instructions for subscribing to their reflector.

If you lack Internet access, try reaching Elecraft at PO Box 69, Aptos, CA 95001-0069; tel 813-662-8345.

Nits to Pick

Are there things I don't like about the K2? Sure. As with any radio, the K2 has some quirks. The first is QSK. Ten-Tec break-in is somewhat better thanks to the small tuning range of their pre-mix VFO, which provides fast TX/RX shifts. Elecraft opted for a non-premix VFO with wider tuning range, offering nearly general coverage and eliminating bridies. Ten-Tec rigs can switch between TX and RX in less than 10 ms. The K2 takes up to 20 ms.

The internal keyer, while fine for general use, is *not* designed for contesting. It takes two button operations to generate a message. No contester wants to use a keyer that takes more than one button operation per message. To alleviate this problem, Elecraft will offer a "one-touch" keyer mode in revised firmware this year.

Then there is the erratic power output readings. In comparing output readings obtained using a precision wattmeter terminated into a 50-Ω nonreactive load and the onboard RF metering in the K2, there were significant differences (on the order of 200-500 mW) each time the K2 was put in the "tune" position. Elecraft says that this is a result of antenna loading and the installation of the automatic antenna tuner should reduce the errors. In order to insure that you operate within QRP power levels, I highly recommend the use of an external wattmeter.

One Terrific Radio

Do I like the K2? Absolutely! This is one terrific radio! The price of a basic kit ($579) is slightly more than one would expect to pay for a used QRP rig. By adding all the options you will have close to $1000 invested in the K2. This cost is offset by the superior performance of the radio, especially receiver performance, which rivals the multi-thousand dollar commercial rigs. In addition, with the K2 you can bask in the pride of building your own gear. QST

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The FCC Must Act Against Restrictive Covenants

By William Frede, W7II
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A letter in the December issue of *QST* by WB2WFJ criticized the stand the ARRL took regarding deed restrictions and CC&Rs. Essentially, he said that prospective home buyers should understand the restrictions attached to the properties they purchase, live with the restrictions and never voice opposition. How easy that would be if there were choices available so that the average ham could buy property with the option to erect an outside antenna. In reality, there are few places remaining to buy antenna-friendly property.

I used to dismiss the stories of people harassed by homeowner and condominium associations for antenna violations. I believed it was their own fault because they made poor housing choices. My perspective changed dramatically when it was *my* turn to move to a new home.

I was determined to play by the "rules" concerning amateur antennas when I began searching for a home in a medium-sized town in Idaho…and quickly discovered that I was restricted to about 10% of the available properties. We wanted to live within city limits, in an average neighborhood where our kids would have friends nearby. Thanks to a loophole in my target neighborhood's CC&Rs, I was able to put up a tower with modest antennas. The struggle was a warning of worse to come.

I discovered how powerful the anti-antenna movement had really become when I had to relocate last summer to a new home in northern San Diego County. It was nearly impossible to find an affordable, newer home in a family-oriented area that allowed outside antennas.

New housing developments are created by land developers and realtors that adopt CC&Rs favoring a living environment where everyone must look and act the same. After a few houses are sold in a new development it is nearly impossible to change the CC&Rs. This is one reason why hams are forced into living in areas that are antenna unfriendly. Choices simply do not exist. In order to preserve harmony in the family, many amateurs must give up outdoor antennas completely.

I feel there are at least three instances where hams have a right to fight the CC&Rs they are reluctantly forced to accept.

(1) **Unequal enforcement of existing rules.** In many developments the residents often ignore the myriad rules that have been adopted. In my own neighborhood…

- The garage door can only be up when the car is going in or out. Nobody follows this rule.
- Dogs shall not constitute a nuisance to the neighbors. There are more barking, obnoxious dogs here than anywhere else I have ever lived.
- Farm livestock or wild animals (including fowl) are not to be kept or raised on lots. My neighbor raises chickens in a backyard pen.

When others openly ignore the rules, why can't I erect an antenna?

(2) **Rules that are clearly designed to discriminate against amateurs.** A clause in my CC&Rs reads: "No lines, wires, or other devices for communication or transmission of electrical current or power, including telephone, television, and radio signals, shall be constructed, placed, or maintained anywhere in or upon any lot unless it is in a conduit." Clearly, this rule was written to outlaw *all* ham radio operation. If this rule were to be truly enforced, then all forms of wireless communication would be outlawed. Cellphones, cordless phones, baby monitors, garage door openers, RC cars, and wireless computer links would not be allowed.

(3) **Rules that are illegal.** Nearly all homeowner and condominium associations disallow any form of outside antenna for reception of local radio or television broadcasts. This is direct violation of the FCC's CS Docket No. 96-83 (see **www.fcc.gov/csb/facts/otard.html**). To summarize, this ruling forbids restrictions that prohibit reception of direct broadcast satellites (DBS), multichannel multipoint distribution (wireless cable), and over-the-air television broadcasts. This ruling is only in effect when the area where the antenna is installed is also in an "exclusive use" area controlled by the owner. (This ruling does not apply to Amateur Radio antennas, although it should.)

I feel that burdensome antenna restrictions are among the most serious threats facing Amateur Radio today. While others blame the Internet and even License Restructuring for the decline of our hobby, our true "wolf at the door" is the overly strict regulations against amateur antennas.

Think of the many young potential hams living in neighborhoods controlled by CC&Rs. Maybe one person attended a local JOTA operation last year and was smitten with the radio bug. He decided to study for his license because the licensing requirements have been relaxed. When his ticket arrives, he is awaiting his first contact with a homemade dipole antenna. That "first contact" would probably be with the local CC&R police demanding that he immediately remove his antenna! We lose a new ham as he trades the radio license for an Internet connection and the CC&R people get another victory for closed garage doors and closed minds.

What are this young person's options under the law? There are none. This is why the FCC should provide relief from unreasonable CC&Rs as they did for local government zoning ordinances. If the FCC truly believes that the Amateur Radio Service is a national resource, they should act to preserve it.

QST Op-Ed Policy

The purpose of Op-Ed is to air member viewpoints that may or may not be consistent with current ARRL policy.

1) Contributions may be up to two-thirds of a *QST* page in length (approximately 900 words).

2) No payment will be made to contributors.

3) Any factual assertions must be supported by references, which do not necessarily have to be included in the body of the article to be published.

4) Articles containing statements that could be construed as libel or slander will not be accepted.

5) The subject matter chosen must be of general interest to radio amateurs, and must be discussed in a way that will be understandable to a significant portion of the membership.

6) With the exception that the article need not be consistent with League policy, the article will be subject to the usual editorial review prior to acceptance.

7) No guarantee can be made that an accepted article will be published by a certain date, or indeed, that it will be published at all; however, only articles that we intend to publish will be accepted, and any article we have decided against publishing will be returned promptly.

8) Send your contributions to ARRL Op-Ed, 225 Main St, Newington, CT 06111.

Jumping Into Public Service with Both Feet

One of the most colorful and interesting club newsletters I've seen is the one produced by the Raleigh Amateur Radio Society of North Carolina. Recently they featured Denyse Walter, KG4CXR, on their cover. She is a very active YL and together with her husband Jim, KG4FIJ, Denyse has jumped into the hobby, especially public service, with both feet. The following is her story…

"Just 2 short years ago, I was introduced to the ham way of life. I thought being a 'ham' was getting in front of the camera. I soon learned otherwise! A friend took me to a meeting of the local radio club, RARS, which is the biggest club in central North Carolina with over 300 members.

"The meeting was a SKYWARN training night and that's all it took. I have been interested in weather since I was a little girl. My grandfather was a weatherman and in his day there was no fancy equipment. He only had the knowledge and understanding of watching what was around him. Animal behavior told him a lot, and he did have a few little things like balloons and a wind monitor of some kind. I always enjoyed being out in all kinds of weather, and as I got older, I watched with him. He told me how the clouds would form for certain storms, and how the ring around the moon with no clouds in sight would bring bad weather. When he died, I thought I'd always go to school to be a meteorologist.

"When the chance came up for involvement in SKYWARN through Amateur Radio, I knew I'd found my chance to get back into weather. Thomas Babb, KF4JKQ, said the only way to get into SKYWARN and talk on the radio was to get a license. With a lot of studying and attendance at the RARS classes, I actually passed the test. I was very proud when I went back to Thomas with my Amateur Radio license in my hand and said, 'Sign me up!'

"After some SKYWARN training I did a few control operations for small storms and took calls from hams in the area for reports on floods, high winds that did damage and hail. It was scary at first because I didn't know a lot about radio operations and copying the call signs was difficult. Sometimes I found myself transposing numbers but I am getting better with practice."

Denyse Walter, KG4CXR.

Learning "On the Job"

"Recently, I was called in for a winter storm to the NWS (National Weather Station) in Raleigh. The people that worked there told me what they wanted and I'd get on the radio and ask for reports. It was really good experience and the meteorologists taught me how to read the radar and wind speed information from their computers. I spent a lot of time with a couple of people that were willing to teach what they knew about locating storms and weather conditions.

"The next event occurred very soon after the winter storm. There was a warm front that came in behind a cold front, which brought lots of tornadic weather. The NWS called for hams who could operate for a 24-hour period. I was the first called and I volunteered in an instant! I had to announce the severity of the storm to SKYWARN's 20-county repeater network. There were reports of tornadoes, flooding and many trees down.

"It was busy, very exciting and the only time in my life I felt like I was in my element. I look forward to the next opportunity to operate from the NWS, and hope one day to be a 'storm chaser' myself. If I'm home during a storm, I usually have my mobile unit on, along with our three handhelds and the local TV for weather. I can never get enough."

More Activities

"Besides SKYWARN, my husband and I enjoy participating in public service events—the walk-a-thons, bike-a-thons and anything else that we can do in the community. We do a 150-mile bike-a-thon once a year, which takes several hams and continues over two days. I'm very glad my husband is a ham, too (he got his license about 2 months after I did). The events we do together have been amazing and fun.

"I'm also the membership chairman of the RARS club and last summer I started a weekly Amateur Radio women's net on a local repeater. We get an average of six YLs checking in every week, even though it has limited coverage. Managing the net is good practice and I love doing it. Recently I began training as a traffic handler. We send and receive messages within the club and out of state. It's something everyone should know. If we lose power or have a catastrophe in the area that takes down phone lines, I want to know the proper procedures. There are several nets in our area every night and I try to check in to at least one of them.

"I really enjoy my involvement with Amateur Radio and I'm very proud to be a ham. I hope to stay with it for a very long time."

For more information about Denyse and the Raleigh Amateur Radio Society, see their Web page at **www.rars.org**. QST

Diane P. Ortiz, K2DO ♦ PO Box 296, Bellport, NY 11713 ♦ k2do@arrl.org

The Legacy of the Globe King

When World War II was over, surplus equipment and parts flooded the market and the country was ready to play radio again. Some of the rigs from pre-war times came back to life. Many hams wanted to convert war surplus radios, and others wanted brand new rigs. The surplus parts that enticed the home-brew builders also stocked the manufacturers' shelves. These surplus parts became the basis for many new radios.

World Radio Labs (WRL) of Council Bluffs, Iowa, was a manufacturer in the right place at the right time. Investing heavily in war surplus material, WRL owner Leo Meyerson produced some of the first post-war transmitters. His popular low-power Globe Trotter was one of those transmitters.

With hams asking for more powerful rigs, WRL prototyped a 1/4-kW transmitter. By 1947, it was ready. Designing it around a pair of United V70D triodes operating in class C, the Globe King was born. It produced over 250-W output on AM.

Within a year, the Globe King had already been redesigned. The original version had a modulator with four 6L6s in push-pull parallel. WRL found that by designing a new modulator, the RF power could be increased to 300-W output at 100% modulation. The new Globe King 400 ran the same United V70Ds in the finals and a pair of Hytron 5514s in the modulator stage. A few additional changes in the Globe King 400 series occurred, but they continued to use the same RF and modulator tubes, and plug-in coils.

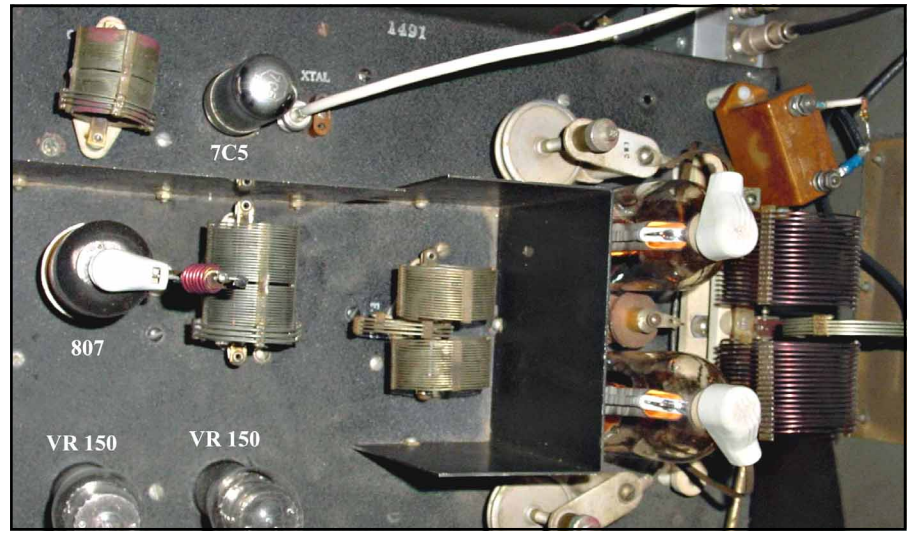
THE STORY OF ONE WRL GLOBE KING 400B

By Steve Marquie, W8TOW

In the fall of 1951, John Eisenman, W8URM, decided he would become a proud owner of a Globe King 400. Now deemed a Globe King 400B, John's new radio included TVI shielding, an improved speech amplifier and some minor RF circuit changes. John was a CW man, though, so he never tried it on phone. Instead, he concentrated on getting his DXCC by running the Globe King 400B only on CW. I am sure he commanded the DX end of the bands!

After almost 30 years in suburban Detroit, John finally sold the rig in 1980. The transmitter was relocated to Mike Beachy, N8ECR. Mike, an avid AMer, made efforts to restore the rig and get it on AM phone.

The class C power supply and the modulator were both giving Mike some problems. He realized some success by replacing the high-voltage bleeder resistor. The transmitter was delivering over



The Globe King RF deck: 7C5 oscillator, 807 driver and two V70D finals.

The station of Steve Marquie, W8TOW. His restored Globe King is at the far left.

Old Radio Profile: Steve Marquie, W8TOW

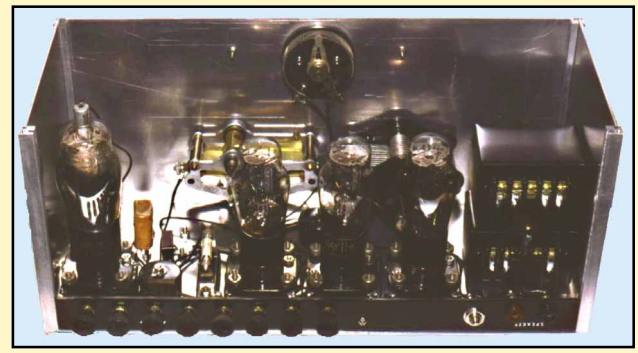
Steve Marquie, W8TOW, became interested in operating AM early on. Originally, he operated CW/SSB like many newcomers to ham radio. Then, in 1977, *CQ Magazine* ran an article titled "No, Harry, AM isn't Dead!" This sparked his curiosity. Within months, he had restored a Viking I transmitter and a 51J2 Collins receiver. He used them in the 40-meter "AM Window." Other AM rigs followed, but eventually the DX bug bit him. Later, he moved to a new home and fell out of radio for a while. In 1997 he rediscovered AM. This time he chose to focus only on AM/CW with vintage radios. This led to an opportunity to restore some of the "big rigs" from yesteryear. Among several home-brew transmitters, his favorite is the 1952 vintage WRL Globe King 400B.

John Dilks, K2TQN ♦ 125 Warf Road, Egg Harbor Township, NJ 08234-8501 ♦ k2tqn@arrl.org

Replicating the Round-the-World Four

In the June 2000 *QST* I said of the Silver Marshall 'Round-the-World Four,' "This radio would be a good candidate to replicate today with old parts…and the cabinet is assembled with small sheets of aluminum. If anyone has already done this, I would like to hear from you."

Well, reader Tom Provost of New Jersey took the challenge. "My recreated Round-the-World Four, circa 2000, is up and running. I completed it last week and powered it up. The first station I received sounded like Radio Japan. Tuning around, I heard some other international broadcasters. I am pleased with its ease of operation," Tom said.



An inside view of Tom's version of the Silver Marshall.

Tom Provost standing next to two broadcast radios, with the replicated Silver Marshall on top.

He indicated that some differences in his replicated version were required because he was unable to find all old parts. He wound a set of four coils for it on National 4-pin forms instead of the 5-pin coils used by Silver Marshall. The audio transformers were impossible to find, so he made his own using miniboxes from RadioShack. He placed barrier strips on them to connect the wires and placed new 3:1 transformers inside each one. He also made the RF chokes, placing them inside small plastic pipe caps so they would look the same as the originals.

For tubes, he used slightly newer ones—1930s 4-pin tubes. The lineup is a 32, 30, 30 and a 31 in the audio output.

The cabinet was made from some pieces of scrap aluminum. The four corners were machined from aluminum square stock using a slitting saw on a lathe. The aluminum stock was acquired at McMaster-Carr. Visually comparing his new radio to an original, I found they are very close in appearance.

For dc power, he made a "B" battery from 64 AA cells. He placed them in a plastic box and used connectors for the wires. For filament power, he used 2 D-cell batteries.

Tom isn't a ham yet, but loves to restore old radios; he has some impressive receivers in his collection. Among them are a Pilot Super Wasp, a Hammarlund Comet Pro, a National SW-3, a couple of HROs, several vintage Hallicrafters and a Technical Material Corporation GPR-90. Additionally he has many early home broadcast radios.

300-W output, with 1450 V dc at 300 ma, but the modulator still refused to work. Power supply problems, together with distorted audio in the speech amp, kept the Globe King silenced for many more years.

Being active on AM early in my ham career (1976), I decided to revisit AM again in the '90s. Motivated by the smell and glow of the tube gear, I convinced Mike to sell the Globe King 400B to me in 1996. Mike and I had been AM buddies for many years. He knew that I wouldn't sleep until it worked, so he agreed to part with the old relic. On a cold Sunday in January 1997, I drove through drifting snow to Pigeon, Michigan, to purchase the transmitter. Six hours later, the fun began!

What I Found

After removing some layers of dirt and crud that had accumulated over the years, I tried an on-the-air evaluation. The results weren't promising, so I decided to dig into the radio.

At 375 pounds, the Globe King is not a lightweight. Working on it requires some planning. The RF chassis, modulator, and the high voltage power supply are on individual decks, all housed in a 3-foot cabinet.

The modulator has its own 1000 V dc power supply, using 866JR mercury vapor rectifiers. This part of the rig was sick. Isolating the modulator's B+ supply by lifting the wire that exited the bleeder resistor, I tried it again. I saw sparks!

Okay, maybe there are other problems. I checked the filter cap. It was good. The choke was good. What next? I had no other 866JRs, so I chose to eliminate the tube rectifiers, replacing them with solid state components. This would also eliminate the filament transformer. I tried again. Now I had 1100 Vdc. Careful inspection identified two problems: (1) the filament transformer was bad, and (2) the tube sockets for the 866JRs were miss-wired from the factory.

On to the speech amp, and more problems. I did put the rig on the air, but the reports were less than favorable. Reports of distorted audio and splatter abounded. Many hours later I had those problems solved. I found that the old carbon resistors had changed value over the years and none of the tubes in the speech amp had the right voltages. I also discovered that the phase inverter tube (6N7) had been miss-wired at the factory. This meant there had been two wiring problems on the same deck. If the original owner had been a phone operator, I'm sure it would have been fixed years ago. Finally, after 45+ years, the Globe King was on the air.

Over the next few months some other minor problems surfaced. Eventually, I replaced every capacitor and resistor on all three decks. All the plug-in coil sockets were cleaned and the tubes were checked and replaced. This work has led to many trouble-free hours of operation and enjoyment. Restoring the 400B was a lot of fun. I may never get DXCC running the Globe King 400B as W8URM did back in the 1950s, but I am getting close to WAS on AM. The 400 is still the "King" to me.

MORE GLOBE KING INFO

For more information on the WRL Globe King transmitter, visit my Web page at **www.eht.com/oldradio/arrl/index.html**. Hamfest season is now here. As always, look for my call letters on my hat and say hello.—*K2TQN*

SILENT KEYS

It is with deep regret that we record the passing of these amateurs.

W1BMS, William L. Hall, Friendship, ME
W1BOU, William J. Tremblay, Peabody, MA
N1GEC, Charles Koluch, Cranston, RI
WB1GKK, Robert N. Lord, Brewer, ME
WB1GKL, Oma E. Ingerson, Bangor, ME
W1HX, Norman H. Young, El Paso, TX
W1JSY, Richard N. Lord, Pinellas Park, FL
W1MHD, Raymond F. Jones, Salem, NH
W1NUO, Tisha L. Young, El Paso, TX
NS1P, Herbert Nickerson, Wilmington, MA
K1RFH, Stephen J. Sorel, Fall River, MA
WA1TBY, James W. Hatherley, Brighton, MA
KA1VEC, Russell T. Hack, Enfield, CT
WN1X, William Jones, Peabody, MA
WA1ZNT, Eugene Hattin, Bolton, CT
W2ANB, John F. Longley, Slingerlands, NY
N2DB, Darlana D. Mayo, Mount Vernon, NY
KA2GHO, Edwin N. Patience, Redwood, NY
KE2GS, J. E. Wolfe, Potsdam, NY
W2HVL, Stanley Ackerman, Delray Beach, FL
K2ICJ, Donald R. Estus, Horsehead, NY
WB2ICN, Irving J. Rohssler, Bronx, NY
*W2KHQ, John C. Klimek, Valatie, NY
K2LOV, Frank M. Gordon, Morris Plains, NJ
W2RCM, Richard C. Munyan, Wenonah, NJ
*KB2SX, Harry M. Schneider, Media, PA
W2UE, Francis W. Schottke, Scottsdale, AZ
W2WSS, Peter J. Gellert, Livingston, NY
N2XUY, John Tillotson, Rochester, NY
WB3GOP, Gary Stueler, Saint Leonard, MD
W3JIM, James M. Lucas, Joppa, MD
W3NTY, Charles M. LaRosa, Fairless Hills, PA
KD3P, W. S. Georgia, Bethesda, MD
K3YKM, William R. Freas, Newport News, VA
W3ZW, Edwin R. Rathbun, Mount Airy, MD
W4AHI, Richard E. McCauley, Steinhatchee, FL
K4BEI, Charles F. Summerall, Gadsden, AL
WB4BLQ, Joseph J. Allen, Clearwater, FL
KD4CIG, Virginia L. Gentry, Thorsby, AL
W4ENR, Bradford H. Buckshorn, Signal Mountain, TN
*N4EQ, Harold W. Porter, Sparkman, AR
WB4EUP, Bertram M. Blum, Myrtle Beach, SC
W4FXG, Eugene H. Polleys, Columbus, GA
N4JLE, Lewis A. Oates, Miami, FL
W4KBL, James Linton, Princeton, KY
KD4LJN, Noel L. Kennedy, Maysville, KY
KB4LPB, William Bell, Charlotte, NC
N4LPR, Sidney Rotz, Coconut Creek, FL
WA4MSV, Norman E. Brown, Chester, SC
W4NVS, Vernon E. Avant, Naples, FL
W4OJK, Robert E. Dryden, Gainesville, FL
‡KF4POD, Jack L. Fogleman, Newport News, VA
W4SVD, Jesse P. Dean, Charlotte, NC
N4TON, George W. Conley, Venice, FL
KB4VWY, Henry R. Geiger, Colonial Heights, VA
K4ZEL, Joseph E. Howell, Charleston, SC
KS4Z, Arnold W. Vincent, Palm Bay, FL
N5BTH, Micah E. Brown, Greenville, TX
KC5BUR, George A. Kitchens, Ransom Canyon, TX
WD5CRE, Charles H. Thornton, Crystal Springs, MS
W5DMG, Robert G. Belshe, Hobbs, NM
W5DO, Edward T. Jurney, Los Alamos, NM
KC5DQ, George M. Adams, Las Cruces, NM
W5IQB, Louis I. Jelly, Baytown, TX
N5JHH, Barbara A. Wise, Cleveland, TX
AC5NY, Richard N. Horan, Broken Arrow, OK
WA5OSD, William L. Stewart, Petal, MS
KB5OYV, Dorothy M. Christenberry, Benton, AR
AD5S, W. T. Dollar, Mesquite, TX
KC5SG, Hilda D. Law, Brighton, CO
WA5SNS, George Bogil, Slidell, LA
W5YAR, Marley Kittleman, Greenville, MS
*KA5YCM, Crawford A. Bishop, Saint Amant, LA
KH6BHJ, William Sato, Kent, WA
W6CFU, Charles K. Wasserzieher, San Pedro, CA
W6CPD, Gerhard Jankel, Corona, CA
N6FO, Jack T. Tolliver, Lancaster, CA
W6FVV, L. E. Tepfer, Weed, CA
K6IFT, R. I. McLain, Scotts Valley, CA
W6IP, Harry H. Weller, Lompoc, CA
WB6NAG, Myrra P. Banks, Blair, OK
W6NDJ, Oscar D. Berg, Stockton, CA
N6NJE, Lucille A. Grenier, Dulzura, CA
K6UML, Robert R. Steele, Antlers, OK
KE6VOJ, Forrest C. Goodbar, Santa Rosa, CA
K6ZLU, Lester W. Gilpin, North Fork, CA
KA7BDB, Edward F. Pledger, Willamina, OR
KE7BO, Henry M. Samplin, Phoenix, AZ
K7CHG, Harris C. Hug, Kent, WA
W7CO, Donald P. Newman, Seattle, WA
W7CSK, Albert C. Oczkewicz, Mount Vernon, WA
K7CTT, Ray C. Larsen, Tacoma, WA
*KN7D, Francis Schroeder, Shelton, WA
WA7IJB, Donald E. Tooley, Las Vegas, NV
K7OGU, Robert W. Pickus, Chehalis, WA
K7TRI, Raymond Nelson, Enumclaw, WA
Ex-WA7UEI, Robert M. Nichols, Tacoma, WA
KC7WF, Donald J. Reibold, Vancouver, WA
KB7ZFF, Bruce Stuart, Peoria, AZ
Ex-N8ANP, Henry P. Babbs, Cincinnati, OH
W8HFA, Hugh C. Mehlenbacher, Escanaba, MI
WA8KEW, Raymond A. Nelson, Saint Joseph, MI
K8KNA, James M. Sigler, Canton, OH
W8PAL, Al Gross, Sun City, AZ
W8TWP, Thomas Pijut, Troy, MI
WB8VEQ, Paul H. Harman, Paintsville, KY
W8VZE, J. V. Dawson, Springfield, OH
W9ATK, J. W. McLeland, Milwaukee, WI
WA9DGC, John L. Modesitt, Brazil, IN
KA9ECY, Gary D. Schriefer, Lamar, IN
*WA9KJB, Robert S. Lynch, Edwardsville, IL
W9KZD, Homer C. Butler, Ashland, IL
WA9LHC, Richard G. Sunderland, Fort Wayne, IN
KB9LNA, Rodney D. Smith, Vincennes, IN
W9MEO, Lowell K. Riley, Eau Claire, WI
N9RMG, Kevin L. Barnes, Jeffersonville, IN
KB9SEQ, Robert E. Helderman, Vincennes, IN
W9ZEN, John M. Vasicak, Oglesby, IL
N0DCA, John N. Henningsen, Richfield, MN
W0FHJ, William R. Farrall, Grand Island, NE
N0HBO, Laurence A. Fish, Urbana, IA
KA0HMI, Delton Gerber, Peever, SD
W0JFK, James F. Deeming, Fort Collins, CO
WA0KKN, Bennie Bost, Raytown, MO
N0KOY, Stanley S. Gerber, Omaha, NE
KD0LJ, Robert L. Ost, Huron, SD
W0OJ, Warren D. George, Littleton, CO
*AC0S, Dean B. Haworth, Golden, CO
W0TIF, Alvo Crawford, Aurora, NE
W0WRY, Wesley A. Jones, Bassett, NE
K0ZCA, Walter G. Sleeper, Des Moines, IA
HB9BWB, Willi Bernleithner, Duebendorf, Switzerland
*VE7YB, K. L. Miller, New Westminster, BC, Canada
VK6BPU/9M2CR, Colin Richards, Perth, Australia

*Life Member, ARRL

‡Call sign has been re-issued through the vanity call sign program.

Note: Silent Key reports must confirm the death by one of the following means: a letter or note from a family member, a copy of a newspaper obituary notice, a copy of the death certificate, or a letter from the family lawyer or the executor. Please be sure to include the amateur's name, address and call sign. Allow several months for the listing to appear in this column.

Many hams remember a Silent Key with a memorial contribution to the ARRL Foundation. If you wish to make a contribution in a friend or relative's memory, you can designate it for an existing youth scholarship, the Jesse A. Bieberman Meritorious Membership Fund, the Victor C. Clark Youth Incentive Program Fund, or the General Fund. Contributions to the Foundation are tax-deductible to the extent permitted under current tax law. Our address is: The ARRL Foundation Inc, 225 Main St, Newington, CT 06111. QST

Kathy Capodicasa, N1GZO ♦ Silent Key Administrator

NEW PRODUCTS

RADIOCOM 5.0 SOUND CARD DIGITAL MODE RECEIVE SOFTWARE

◊ Bonito Inc has introduced a new version of their *RadioCom* multifunction DSP, rig control and digital mode decoder software. The manufacturer reports that they have incorporated over two hundred improvements over the previous version of the program.

Highlights include a "RTTY Decoder" that handles RTTY, SITOR, BPSK, QPSK, NAVTEX and SYNOP; a "Fax Decoder" for AM and FM Fax, Fax-Special-Filter, HAM-Fax, Weather-Fax and SAT-Fax direct; an "SSTV Decoder" and a "CW Decoder."

The program also features an "Audio Recorder"; a "Filter Equalizer"; a "Channel Scanner"; a "Frequency Scanner"; and a "Time Manager." Satellite tracking capabilities are built in as well.

Received signals can be analyzed with a "Time Spectro Scope," a "Spectrum Analyzer," and an "X/Y Scope."

An "Audio Controller" commands all audio functions. The DSP filter includes an "FFT Equalizer" that allows activation of several notch filters in one band filter or the creation of a filter curve with a desired form and slope.

RadioCom 5.0 is designed to work with almost any SSB receiver (or transceiver), but a computer-controllable radio is recommended. A level converter included with the package is said to work with more than 80 receivers and transceivers that do not provide direct RS-232 interface capabilities.

A receive/transmit version of this software—*Radio 5.0 TX*—is slated for release later this year.

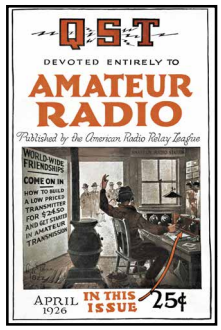
Minimum computer system requirements are a 200-MHz Pentium/Celeron processor, VGA video with 16-bit color and a screen resolution of 1024×768, a 16-bit sound card and a *Windows 95*, *98*, *NT 4.0* (Service Pack 3), *ME* or *2000* operating system.

For more information contact Bonito at **www.bonito.net**, or their US distributor: Computer International, 207 South Old US-27, St Johns, MI 48879: tel 877-977-6918 (toll free); **info@computer-int.com**; **www.computer-int.com**. QST

Previous New Products

75, 50 AND 25 YEARS AGO

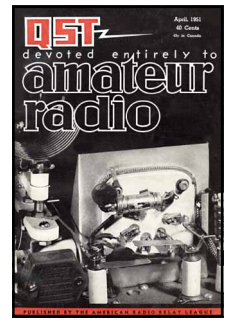
April 1926



◊ Clyde Darr's, 8ZZ, cover art shows a ham at his operating position, waving interested bystanders in for a closer look. A billboard on one wall says, "World-Wide Friendships … Come on in … How to build a low priced transmitter for $24.50 and get started in amateur transmission." K. B. Warner again looks to the past with an editorial quote from a *QST* of nine years before, showing once more that what was true then is still true today: "… The romance of sitting alone in our little out-of-the-way room … in communication with congenial spirits in other distant and out-of-the-way little rooms is conducive to profound and reverent thoughts." Ah—the magic, mystery, and miracle of radio communication is upon us!

"Breaking into Amateur Transmission," by John Clayton, helps the former short-wave listener see how easy it is to build a transmitter and join in on *all* of the fun. A. S. Blatterman describes "The Making of a Single-Control Receiver," whose single control varies several tuned circuits. R. C. Hitchcock discusses how "Condensers in Series" can be used to make up virtually any value of capacitance. Technical Editor Robert Kruse tells how "Peaked Audio Amplifiers" can be used to good advantage to pull C.W. signals out of the noise and interference. "How Antennaz Shirk," by Bub McGut, 1ARE, is an April Fool's spoof that discusses weighty topics such as, "The dielectric between the antenna and the ground contains countless electrons in elastic suspension…." J. K. Clapp, in "Amateur Wavechangers," addresses the modern problem of wanting to change bands with the transmitter very quickly. "Some Low-Power Records" tells how Windom, 8GZ-8ZG, broke the low-power DX records of 9CK—but the editor says "… we do not want to spend the rest of our days trying to figure up 'miles per watt' …."

April 1951



◊The cover photo shows the underside of a tube socket in a homebrew HF ham transmitter. The editorial gives further commentary on the recent FCC Docket 9295, with its restructuring of the amateur license classes.

Stephen Friedland, W5PKI, discusses "Radiological Monitoring," a subject of concern during these Cold War years. George Grammer, W1DF, talks about "By-passing for Harmonic Reduction." F. E. Ladd, W2IDZ, describes "A Bandswitching Converter for 144 to 21 Mc." that will provide better reception at V.H.F. and on the higher HF bands. Bob Gunderson, W2JIO, the blind ham featured as the subject of a recent *QST* article, discusses measurement techniques for the vision-impaired, in "Auditory Test Equipment." Phil Rand again tackles the bear of television interference, with "TVI-Proofing the 10-Meter Transmitter."

In "Happenings of the Month," the newly adopted rules for the Disaster Communications Service are published. Clark Rodimon, W4SZ, and Joseph Farago present "A Miniature Transmitter for 220 Mc.," which provides $3\frac{1}{2}$ watts output in a transmitter package smaller than an 807 tube. Jack Herbstreit, W4JNX, discusses "Automatic Spacing of Letters and Words for the Electronic Key." One of the highlights of this month's issue is "Numerology and Amateur Radio," by Madame Evelyn Leigh-Falcon, "… one of the outstanding numerologists in England, and perhaps the entire world." Madame Leigh-Falcon acquaints the reader with the "vibrational value" of individual letters of the alphabet, and tells hams how to determine the true meaning of their call signs. This timeless article deserves your rapt attention.

April 1976

◊The cover photo shows the amplifier described in this issue that runs 1 kW—using transistors! The editorial takes "Another Look at CB," urging hams and ham clubs to look upon the great number of CBers as prospective hams.

H. O. Granberg, WB2BHX/OH2ZE/7, tells how to run "One kW—Solid-State Style." Doug DeMaw, W1CER, explains "How to Use Zener Diodes." "An ITV Cure for 6 Meters," by Dick Jansson, WA1QLI, details how to keep TV signals out of one's 6-meter receiver. Dana Atchley, W1CF, Harold Stinehelfer, and Joseph White used microwave techniques to design some 80-meter "360°-Steerable Vertical Phased Arrays." The new Heath HW-8 QRP Transceiver is featured in "Product Review." Don Waters describes Amateur Radio's help in the aftermath of "The Guatemalan Earthquakes—February 1976."

The CW operator will profit from the excellent article by Tinh Ehres, WH0OP, "CW Super-Selectivity," describing how to place reeds from a cheap harmonica in your headphones to produce an extremely sharp peak at 440 Hz, completely eliminating interfering signals at other audio frequencies. It is a fascinating example of the inexpensive application of simplistic technology for the betterment of man- (and woman-) kind. (Best results will be obtained if used by April 1.) QST

Al Brogdon, W1AB ♦ Contributing Editor

W1AW Schedule

PACIFIC	MTN	CENT	EAST	MON	TUE	WED	THU	FRI
6 AM	7 AM	8 AM	9 AM		FAST CODE	SLOW CODE	FAST CODE	SLOW CODE
7 AM-1 PM	8 AM-2 PM	9 AM-3 PM	10 AM-4 PM	VISITING OPERATOR TIME (12 PM - 1 PM CLOSED FOR LUNCH)				
1 PM	2 PM	3 PM	4 PM	FAST CODE	SLOW CODE	FAST CODE	SLOW CODE	FAST CODE
2 PM	3 PM	4 PM	5 PM	CODE BULLETIN				
3 PM	4 PM	5 PM	6 PM	TELEPRINTER BULLETIN				
4 PM	5 PM	6 PM	7 PM	SLOW CODE	FAST CODE	SLOW CODE	FAST CODE	SLOW CODE
5 PM	6 PM	7 PM	8 PM	CODE BULLETIN				
6 PM	7 PM	8 PM	9 PM	TELEPRINTER BULLETIN				
6^{45} PM	7^{45} PM	8^{45} PM	9^{45} PM	VOICE BULLETIN				
7 PM	8 PM	9 PM	10 PM	FAST CODE	SLOW CODE	FAST CODE	SLOW CODE	FAST CODE
8 PM	9 PM	10 PM	11 PM	CODE BULLETIN				

W1AW's schedule is at the same local time throughout the year. The schedule according to your local time will change if your local time does not have seasonal adjustments that are made at the same time as North American time changes between standard time and daylight time. From the first Sunday in April to the last Sunday in October, UTC = Eastern Time + 4 hours. For the rest of the year, UTC = Eastern Time + 5 hours.

♦ **Morse code transmissions:**

Frequencies are 1.818, 3.5815, 7.0475, 14.0475, 18.0975, 21.0675, 28.0675 and 147.555 MHz.

Slow Code = practice sent at 5, $7\frac{1}{2}$, 10, 13 and 15 wpm.

Fast Code = practice sent at 35, 30, 25, 20, 15, 13 and 10 wpm.

Code practice text is from the pages of *QST*. The source is given at the beginning of each practice session and alternate speeds within each session. For example, "Text is from July 1992 *QST*, pages 9 and 81," indicates that the plain text is from the article on page 9 and mixed number/letter groups are from page 81.

Code bulletins are sent at 18 wpm.

W1AW qualifying runs are sent on the same frequencies as the Morse code transmissions. West Coast qualifying runs are transmitted on approximately 3.590 MHz by K6YR. At the beginning of each code practice session, the schedule for the next qualifying run is presented. Underline one minute of the highest speed you copied, certify that your copy was made without aid, and send it to ARRL for grading. Please include your name, call sign (if any) and complete mailing address. Send a 9×12-inch SASE for a certificate, or a business-size SASE for an endorsement.

♦ **Teleprinter transmissions:**

Frequencies are 3.625, 7.095, 14.095, 18.1025, 21.095, 28.095 and 147.555 MHz.

Bulletins are sent at 45.45-baud Baudot and 100-baud AMTOR, FEC Mode B. 110-baud ASCII will be sent only as time allows.

On Tuesdays and Fridays at 6:30 PM Eastern Time, Keplerian elements for many amateur satellites are sent on the regular teleprinter frequencies.

♦ **Voice transmissions:**

Frequencies are 1.855, 3.99, 7.29, 14.29, 18.16, 21.39, 28.59 and 147.555 MHz.

♦ **Miscellanea:**

On Fridays, UTC, a DX bulletin replaces the regular bulletins.

W1AW is open to visitors from 10 AM until noon and from 1 PM until 3:45 PM on Monday through Friday. FCC licensed amateurs may operate the station during that time. Be sure to bring your current FCC amateur license or a photocopy.

In a communication emergency, monitor W1AW for special bulletins as follows: voice on the hour, teleprinter at 15 minutes past the hour, and CW on the half hour.

Headquarters and W1AW are closed on New Year's Day, President's Day, Good Friday, Memorial Day, Independence Day, Labor Day, Thanksgiving and the following Friday, and Christmas Day.

COMING CONVENTIONS

DELTA DIVISION CONVENTION

April 20-21, Little Rock, AR

The Delta Division Convention, sponsored by the Arkansas Radio Emergency Service and 9 other clubs, will be held at the Little Rock Expo Center, Exit 126 off I-30 in SW Little Rock, near the Pulaski County line. Doors are open Friday 4-8 PM, Saturday 8 AM to 4 PM. Features include flea market, computer and equipment dealers, vendors, tailgating ($15 per space), special exhibits and displays, forums, technical table (test your own equipment), contests, foxhunts, Wouff Hong ceremony, ARES/RACES, VE sessions, handicapped accessible. Talk-in on 145.13. Admission is $7. Tables are $30 (8-ft, dealers), $20 (flea market, electric power $5 per outlet). Contact Jim Blackmon, K5VZ, 1008 Pine St, Arkadelphia, AR 71923-4919; 870-246-6734 or 870-246-7833; fax 870-246-6736; **k5vz@ezclick.net**; **www.aristotle.net/~hamfest**.

SOUTHEASTERN VHF CONFERENCE

April 20-21, Nashville, TN

The Southeastern VHF Conference, sponsored by the Southeastern VHF Society, will be held at the Holiday Inn Select-Brentwood, 760 Old Hickory Blvd; Exit 74A off I-65. Doors open Friday 8 AM to 9 PM, Saturday 8 AM to 5:30 PM. Features include technical presentations, conference proceedings, antenna gain measurements, noise figure measurements, auction, flea market, vendors, sales displays, exhibits, annual business meeting, QSL card checking, banquet (Saturday, 7 PM, with special guest speaker Emil Pocock, W3EP). Admission is $35 in advance, $40 at the door. Tables are $5 (Friday night flea market). Contact Bob Lear, K4SZ, Box 1269, Dahlonega, GA 30533; 706-864-6229; **k4sz@alltel.net**; **www.svhfs.org/**.

INTERNATIONAL DX CONVENTION

April 20-22, Visalia, CA

The International DX Convention, sponsored by the Northern California DX Club, will be held at the Holiday Inn Plaza Park, 9000 W Airport Dr; located at the intersection of State Hwys 99 and 198. Features include vendors, exhibitors, DX forums, contest forums, technical talks, special DX-related programs, banquet (Saturday eve). Admission is $60 in advance, $65 at the door. Contact Dick Letrich, W6KM, 3686 Kirk Rd, San Jose, CA 95124-3816; 408-267-2624; **dlw6km@aol.com**; **www.ncdxc.org/**.

WASHINGTON STATE CONVENTION

April 21-22, Yakima

The Washington State Convention, sponsored by the Yakima ARC, will be held at the Masonic Center, 510 N Naches Ave; Exit 33 off I-82 to Yakima City Center, turn right onto Naches Ave. Doors are open Saturday 9 AM to 4 PM, Sunday 9 AM to 1 PM. Features include banquet (Saturday eve), VE sessions (Saturday), handicapped accessible, refreshments. Talk-in on 146.66. Admission is $5. Tables are $10. Contact Jack Wrenn, N7KNO, 621 S 15th Ave, Yakima, WA 98902; 509-249-0897; **n7kno@arrl.net**; **eagle.ykm.com/~w7aq/hamfest.html**.

DELAWARE STATE CONVENTION

April 29, New Castle

The Delaware State Convention, sponsored by the Penn-Del ARC, will be held at the Nur Temple on Rte 13, 1/4 mile N of the intersection of Rtes 13 and 40. Doors are open for setup 6 AM; public 8 AM to 1 PM. Features include vendors, tailgating ($10 per space; first-come, first-served basis), certified SKYWARN spotter training class, VE sessions, ARRL and club leaders forum, refreshments. Talk-in on 146.955, 224.22. Admission is $5, under 12 free. Tables are $15 (with electricity), $12 (without electricity), includes vendor admission ticket; by reservation only (send payment to Penn-Del Hamfest 2001, Box 1964, Boothwyn, PA 19061). Contact Hal Frantz, KA3TWG, 302-793-1080; **hfrantz@snip.net**; **www.high-tech-services.com/penndel**.

March 30-31
Maine State, Lewiston*
Nebraska State, Norfolk*

March 31-April 1
Maryland State, Timonium*

June 1-3
Atlantic Division, Rochester (Henrietta), NY
Northwestern Division, Seaside, OR

June 2
Georgia Section, Marietta

June 8-10
West Gulf Division, Arlington, TX

June 9
Eastern Pennsylvania Section, Bloomsburg

*** See March *QST* for details.**

EASTERN NEW YORK SECTION CONVENTION

April 29, Poughkeepsie

The Eastern New York Section Convention, sponsored by the Mt Beacon ARC, will be held at John Jay High School, Rte 52 (Fishkill); Exit 15 off I-84, turn right on Lime Kiln Rd, left onto Rte 52, school is on left after passing Hudson Valley Research Park. Doors are open 8 AM to 1 PM. Features include large indoor and outdoor location, giant electronics flea market, forums, tailgating, VE sessions, refreshments. Talk-in on 146.97 (100 Hz). Admission is $5, spouses and kids free. Tables are $10 in advance, $12 at the door (discount offer if you bring your own table—$6 for 2 spaces). Contact Ken Akasofu, KL7JCQ, 8C Hudson Harbor Dr, Poughkeepsie, NY 12601; 845-485-9617; **kl7jcq@arrl.net**; **www.qsl.net/mbarc**.

LOUISIANA STATE CONVENTION

May 4-5, Baton Rouge

The Louisiana State Convention, sponsored by the Baton Rouge ARC, will be held at the Baker Municipal Auditorium, 3325 Groom Rd (Baker), approximately 6 miles N of Baton Rouge, just off Hwy 19. Doors are open Friday 5-8 PM, Saturday 8 AM to 4 PM. Features include flea market, forums (technical, ARRL, MARS), VE sessions (Saturday noon). Talk-in on 146.79. Admission is $4 in advance (until Apr 24), $5 at the door. Tables are $15. Contact Herb Ramey, W5LSU, Box 68, Greenwell Springs, LA 70739; 225-654-6087 or 1-800-FEST; **w5lsu@att.net**; **www.brarc.org**.

SOUTH CAROLINA STATE CONVENTION

May 5, Greenville

The South Carolina State Convention, sponsored by the Blue Ridge ARS, will be held at the Spartanburg County Fairgrounds, 275 Bishop St (Spartanburg); I-85 to Exit 79, turn toward Spartanburg; after passing under Business I-85, turn right at 3rd light, then right at "T", Bishop St is 1 block on left, follow signs. Doors are open 8 AM to 3 PM. Features include large outdoor tailgating area, indoor vendor area, RV camping (Friday night), VE sessions, refreshments. Talk-in on 146.61. Admission is $4 in advance, $5 at the door. Tables are $11, electricity $5, chairs $1. Contact Bob Watson, W4RGW, 501 Ferguson St, Clinton, SC 29325; 864-833-2204; **w4rgw@arrl.net**; **www.brars.org**.

ALABAMA STATE CONVENTION

May 5-6, Birmingham

The Alabama State Convention, sponsored by the Birmingham ARC, will be held at the Zamora Temple, 3521 Ratliff Rd; I-459, Exit 27, follow signs; or Exit 135 off I-20. Doors are open Saturday 9 AM to 5 PM, Sunday 9 AM to 4 PM. Features include flea market (Ellis Dobbins, K4LI, 205-608-1866), commercial vendors (Glenn Glass, KE4YZK, 205-681-5019), tailgating (Dan Morgan, KB4MDI, 205-822-5242), exhibitors, forums, VE sessions (both days at 8 AM sharp), banquet (James Pilman, KA4ZQA, 205-467-3315). Talk-in on 146.88. Admission is $5 (good for both days), under 12 free when accompanied by an adult. Tables are $30 (vendors), $20 (flea market). Contact Glenn Glass, KE4YZK, 205-681-5019; **ke4yzk@bellsouth.net**; **www.w4cue.com**.

WEST TEXAS SECTION CONVENTION

May 5-6, Abilene

The West Texas Section Convention, sponsored by the Key City ARC, will be held at the Abilene Civic Center, 1100 N 6th St; I-20 to Pine St Exit, S on Pine to the intersection of Pine and N 6th, Civic Center on NW corner. Doors are open Saturday 8 AM to 5 PM, Sunday 9 AM to 2 PM. Features include VE sessions, limited RV parking (nominal fee), handicapped accessible, free parking, refreshments. Talk-in on 146.76. Admission is $7 in advance (must be received by Apr 30), and $8 at the door. Tables are $7. Contact Peggy Richard, KA4UPA, 1442 Lakeside Dr, Abilene, TX 79602; 915-672-8889; **ka4upa@arrl.net**; **www.angelfire.com/tx/kcarc76/hamfest.html**.

Attention Hamfest and Convention Sponsors:

ARRL HQ maintains a date register of scheduled events that may assist you in picking a suitable date for your event. You're encouraged to register your event with HQ as far in advance as your planning permits. Hamfest and convention approval procedures for ARRL sanction are separate and distinct from the date register. Registering dates with ARRL HQ doesn't constitute League sanction, nor does it guarantee there will not be a conflict with another established event in the same area.

We at ARRL HQ are not able to approve dates for sanctioned hamfests and conventions. For hamfests, this must be done by your division director. For conventions, approval must be made by your director and by the executive committee. Application forms can be obtained by writing to or calling the ARRL convention program manager, tel 860-594-0262.

Note: Sponsors of large gatherings should check with League HQ for an advisory on possible date conflicts before contracting for meeting space. Dates may be recorded at ARRL HQ for up to two years in advance. QST

Gail Iannone ♦ Convention Program Manager

HAMFEST CALENDAR

Attention: The deadline for receipt of items for this column is the **1st of the second month preceding publication date**. For example, your information must arrive at HQ by **April 1** to be listed in the **June** issue. Hamfest information is accurate as of our deadline; contact sponsor for possible late changes. For those who send in items for Hamfest Calendar and Coming Conventions: Postal regulations prohibit mention in *QST* of prizes or any kind of games of chance such as raffles or bingo.

(Abbreviations: *Spr* = Sponsor, *TI* = Talk-in frequency, *Adm* = Admission.)

†**Alabama (Albertville)—Apr 14**, 8 AM to 3 PM. *Spr:* Marshall County ARC. Albertville Recreation Center, just off Hwy 431. VE sessions. *TI:* 147.2 (100 Hz). *Adm:* $6. Tables: $1.50 per foot. Buddy Smith, AC4B, 102 George Washington Dr, Boaz, AL 35957; 256-593-7741; **kc4url@bellsouth.net**.

Alabama (Birmingham)—May 5-6, Alabama State Convention. See "Coming Conventions."

†**Alabama (Moulton)—Apr 28**; set up 7 AM; public 9 AM. *Spr:* Bankhead ARC. H. A. Alexander Park, Moulton Recreation Center; 1 mile W of Courthouse on Court St. VE sessions (9:15 AM; bring required documents). *TI:* 146.96, 442.425. *Adm:* $5. Tables: $10. Lee Creuzer, N8MHC, 256-351-7916; **n8mhc1@cs.com**; **www.n4idx.org**.

†**Arizona (Phoenix)—Apr 7**, 6 AM to 2 PM. *Spr:* Arizona ARC. DeVry Technical Institute, S parking lot, 2149 W Dunlap Ave; I-17 to central Phoenix, exit Dunlap Ave, go E approximately 1 mile, follow signs to parking. Tailgating ($5), VE sessions (8-10 AM). *TI:* 147.28. *Adm:* $1. Tables: $10. George Cooney, KQ7C, 21 E Colter St, Phoenix, AZ 85012; 602-274-6212; **georgie@aztec.asu.edu**.

†**Arizona (Sierra Vista)—May 5**, 6 AM to 2 PM. *Spr:* Cochise ARA. Green Acres Hqtrs and Antenna Farm, 2756 Moson Rd; from the intersection of Fry Blvd and State Hwys 90 and 92 (at the Target store), go E on Hwy 90 (an extension of Fry Blvd), 4 miles to Moson Rd, go S (right) on Moson Rd for 2 miles, Antenna Farm on right. Tailgating ($5), VE sessions, refreshments. *TI:* 146.76 (162.2 Hz). *Adm:* Free. Tables: $7. Robert L. (Larry) Warren, KF7TJ, 9519 E Nevada Dr, Hereford, AZ 85615; 520-803-1453; **warnel@juno.com**; **www.qsl.net/k7rdg**.

Arkansas (Fort Smith)—Apr 7. Win Dooley, W5JAG, 501-785-5313.

Arkansas (Little Rock)—Apr 20-21, Delta Division Convention. See "Coming Conventions."

†**California (Sonoma)—Apr 28**; set up 7 AM; public 8 AM to noon. *Spr:* Valley of the Moon ARC. Sonoma Valley Veteran's Memorial Building, 126 First St W, 1 block N of the central Sonoma Plaza, Hwy 12. Indoor and outdoor electronics swapmeet ($10 per space; no charge for Amateur Radio organizations for informational tables and displays), VE sessions (walk-ins, register 9 AM, exams 10 AM, all license elements), forums, operating QRP station, display of homebuilt equipment, beginner's DF hunt, full breakfast (8-10 AM, $5). *TI:* 145.35 (88.5 Hz). *Adm:* Free. Darrell Jones, WD6BOR, 358 Patten St, Sonoma, CA 95476; 707-996-4494; **wd6bor@aol.com**.

California (Visalia)—Apr 20-22, International DX Convention. See "Coming Conventions."

†**Connecticut (Southington)—Apr 1**; set up 6:30 AM; public 9 AM to 1 PM (Early Bird Special: doors open at 8:30 AM and admission is $10 until 9 AM). *Spr:* Southington ARA. Southington High School, Pleasant St; I-84, Exit 32, Rte 10 S for 1 mile, left on Flanders, go 1/2 mile to Pleasant St on right. Flea market, vendors, new and used computer and amateur equipment, tailgating ($15 per car space, includes admission; first-come, first-served basis), meetings (annual spring ARES, CT Spectrum Management Assn), VE sessions (exams of all classes; must pre-register, no walk-ins), refreshments. *TI:* 145.49, 224.8, 444.25 (77 Hz). *Adm:* $5, under 12 free. Tables: 6-ft, advance $12, door $15. Make checks payable to SARA and send with SASE to Chet Bacon, KA1ILH, c/o SARA, Box 873, Southington, CT 06489; 860-628-9346; **chet@chetbacon.com**; **www.chetbacon.com/sara.htm**.

Delaware (New Castle)—Apr 29, Delaware State Convention. See "Coming Conventions."

Florida (Coral Gables)—Apr 21. Bill Moore, WA4TEJ, 305-264-4465.

†**Florida (Gainesville)—Apr 28**. *Spr:* Gainesville ARS. Alachua County Fairgrounds; E on SR 222, next to Airport. VE sessions, tailgating ($6, plus admission), camping ($10, plus admission). *TI:* 146.82. *Adm:* $5. Tables: $7 (plus admission). Walt Johnston, W4TKE, 3612 NW 107th Terr, Gainesville, FL 32606; 352-332-3386; **w4tke@gator.net**; **gars.net/hamfest**.

†**Florida (Jacksonville)—Apr 6-7**; Friday 4 PM to Saturday 3 PM. *Spr:* Greater Jacksonville Hamfest Assn. Dog Fanciers Association Field, Morse Ave, W side off Blanding Blvd. Tailgate/Swapmeet only, barbeque, overnight self-contained camping. *TI:* 146.76. *Adm:* $5. Tables: $5. Larry Rich, W1LR, 87 Preakness Plaza, Orange Park, FL 32073; 904-272-1472; **lrich@pobox.com**; **www.jacksonville.net/~lrich/JAXTAILGATE.html**.

†**Florida (Tampa)—Apr 21**, 8 AM to 1 PM. *Spr:* Tampa ARC. Clubhouse and grounds, 7801 N 22nd St; I-275 to Sligh Ave, E to 22nd St, N to Clubhouse. Tailgating. *TI:* 147.105 (146.2 Hz). *Adm:* $2. Tables: $15. Biff Craine, K4LAW, 13515 Greenleaf Dr, Tampa, FL 33613; 813-265-4812; **k4law@arrl.net**; **www.hamclub.org**.

†**Georgia (Calhoun)—Apr 28**, 8 AM to 2 PM. *Spr:* Cherokee Capital ARS. Sugar Valley Community Center, Hwy 136; from I-75 take Exit 320, turn W, travel 6.5 miles and turn left onto Hwy 136 conn, travel 3.6 miles to site on left. Tailgating, new and used equipment dealers, VE sessions, refreshments. *TI:* 145.23, 146.745. *Adm:* $5. Tables: $5. James Howard, WQ4T, 171 Brian Dr SW, Calhoun, GA 30701, 706-625-0508; **wq4t@arrl.net**; **www.qsl.net/k4woc**.

†**Illinois (Arthur)—Apr 29**, 8 AM to 1 PM. *Spr:* Moultrie ARK. Moultrie/Douglas County Fairgrounds, SE edge of Arthur, S of Rte 133, behind High School. *TI:* 146.655, 444.275. *Adm:* $5, under 14 free. Tables: 8-ft $10 (paid in advance). Ralph Zancha, WC9V, c/o MARK, Box 91, Lovington, IL 61937; 217-543-2178 (days) or 217-873-5287 (eves); **rzancha@one-eleven.net**.

†**Illinois (Sandwich)—May 6**; set up 6 AM; public 8 AM to 1 PM. *Spr:* Kishwaukee ARC. Sandwich Fairgrounds, just N of Rte 34 intersection of Suydam and Gletty Rds. Electronics, vendors, free tailgating, overnight camping (electric hookup $15), refreshments. *TI:* 146.73 (100 Hz), 146.52. *Adm:* advance $5 (double stub), door $6 (single stub). Tables: 8-ft $10. Make checks payable to KARC and send with SASE by Apr 20 to KARC, Box 371, DeKalb, IL 60115; or contact Bob Yurs, W9ICU, 815-895-3310 or 815-895-5049; **w9icu@home.com**; **tbcnet.com/~jleonard/hamfest.htm**.

†**Kentucky (Louisa)—May 5**; set up 7 AM; public 8 AM to 3 PM. *Spr:* Big Sandy ARC. Louisa Middle School, Bulldog Ln; turn off US 23 onto Rte 2565, go to Rte 644, at flashing light turn right onto Bulldog Ln, across from Three Rivers Hospital. Vendors, tailgating ($3), VE sessions, special meeting of District No 9 ARES program, refreshments. *TI:* 147.39 (127.3 Hz). *Adm:* $4. Tables: $4. Fred Jones, WA4SWF, 511 N Lackey Ave, Louisa, KY 41230; 606-638-9049, **wa4swf@arrl.net**; **www.bsarc.org**.

Louisiana (Baton Rouge)—May 4-5. Louisiana State Convention. See "Coming Conventions."

†**Maine (South Portland)—Apr 7**; set up 6:30 AM; public 8 AM to noon. *Spr:* Portland Amateur Wireless Assn. American Legion Hall, 417 Broadway; from Maine Tnpk, Exit 7, turn N on Main St (US Rte 1), at Cash Corner turn right on Broadway, continue to site. Electronics flea market, consignment table, "Last Chance" auction (noon), handicapped accessible, free parking, refreshments. *TI:* 146.73 (100 Hz), 147.09. *Adm:* $5. Tables: $10 (includes 1 admission with each table). Bryce Rumery, K1GAX, 75 Ocean House Rd, Cape Elizabeth, ME 04107; 207-799-1116; **k1gax@arrl.net**; **www.digilogic.com/pawabra/pawa/pawa.htm**.

†**Maryland (Grasonville)—May 5**; set up 6 AM; public 8 AM to 2 PM. *Sprs:* Kent Island and Anne Arundel ARCs. VFW Grounds; eastbound Exit 43B on Rte 50, about 1 mile past the Kent Narrows Bridge; westbound Exit 44 on Rte 50, VFW Ave. Hamfest and Electronics Flea Market, tailgating (free to licensed hams), refreshments. *TI:* 146.94, 147.105, 146.43. *Adm:* $5. Ray Allen, W2KBR, 410-969-8042; **w2kbr@bayserve.net**.

†**Maryland (Hagerstown)—May 6**; set up Saturday 6 PM (overnight security provided); public Sunday 6 AM to 3 PM. *Spr:* Antietam Radio Assn. Washington County Agricultural Center, MD Rte 65 S, Sharpsburg Pike; I-70, Exit 29, take MD Rte 65 S, 6.5 miles to Center on left. Large indoor vendor area, tailgating ($5 per space), programs, VE sessions (1 PM, walk-ins accepted), refreshments. *TI:* 147.09. *Adm:* $5, under 13 free. Tables: 6-ft, advance $10, door $15. Carl Morris, WN3DUG, c/o Antietam Radio Assn, Box 52, Hagerstown, MD 21741; 717-267-3411; fax 717-261-9487; **morriscw@cvn.net**; **www.qsl.net/w3cwc**.

Massachusetts (Cambridge)—Apr 15. Nick Altenbernd, KA1MQX, 617-253-3776.

†**Massachusetts (Framingham)—Mar 25**; set up 7:30 AM; public 9 AM to 1 PM. *Spr:* Framingham ARA. Framingham High School; Mass Pike to Exit 13, Rte 30 W to Rte 126 N, 1.3 miles to 'A' St, School on left. Flea market, radio equipment, computers, commercial vendors, dealers, ARRL info, VE sessions (Jim Weckback, W1EQW, 508-435-6487), refreshments. *TI:* 147.15. *Adm:* $3. Tables: advance $10, door $14. Beverly Lees, N1LOO, c/o FARA, Box 3005, Framingham, MA 01705; 508-626-2012.

†**Michigan (Cadillac)—May 5**, 8 AM to noon. *Spr:* Wexaukee ARC. Cadillac Jr High School, 800 Chestnut; US 131 to Cadillac, turn W at Pine St, go 3 blocks to School. Amateur Radio and Computer Swapmeet, vendors, VE sessions (10:30 AM; must preregister), QCWA meeting, free parking, refreshments. *TI:* 146.98. *Adm:* $5. Tables: $8 (8-ft). Alton McConnell, NU8L, Box 163, Cadillac, MI 49601; 231-862-3774; **amcconnell3@hotmail.com**.

†**Missouri (Joplin)—Apr 14**; set up Friday 6-10 PM, Saturday 6-8 AM; public 8 AM to 3 PM. *Spr:* Joplin ARC. John Q. Hammons Trade Center, 3615 Range Line Rd; from I-44, Exit 8-B (Business US 71), right at first street, go 1/4 mile E, next door to Holiday Inn. Vendors, dealers, VE sessions (register at 9:30 AM; testing at 10 AM sharp; walk-ins welcomed), forums (ARRL, ARES, weather seminars). *TI:* 147.21. *Adm:* advance $5, door $6 (under 12 free when accompanied by paying adult). Tables: private $10, commercial $20 (limited electricity available, bring your own extension cords). Ray Brown, KB0STN, c/o JARC, Box 2983, Joplin, MO 64803-2983; 417-781-4967, **raybrown@ipa.net**; **www.joplin-arc.org**.

Nebraska (Omaha)—Apr 8. Scott Avery, KA4ZZQ, **ka4zzq@aol.com**. (Auction)

†**New Hampshire (Hopkinton)—May 4-5**; Friday 9 AM to end of event on Saturday. *Spr:* HOSSTRADERS. Hopkinton State Fairgrounds, off I-89, Exit 7. Largest hamfest in New England, commercial dealers, VE sessions (Saturday 9 AM to noon, 4-H Building; all license exams, walk-

†ARRL Hamfest

Gail Iannone ♦ Convention Program Manager

ins welcomed), RV campsites, refreshments. *Adm:* $10 (Friday 9 AM to 3 PM), $5 (Friday 3 PM until end of event on Saturday). Seller's space: $10 each (no advanced registration). Joe Demaso, K1RQG, HC 78, Box 126E, Bucksport, ME 04416-9611; 207-469-3492; **k1rqg@aol.com**; **www.qsl.net/k1rqg**.

New Hampshire (Londonderry)—Apr 7. Paul Gifford, K1LL, 603-883-3308.

†**New Jersey (North Crosswicks/Hamilton Twp)—Apr 1** (rain date Apr 8); sellers 6:30 AM, buyers 8 AM. *Spr:* Delaware Valley Radio Assn. Tall Cedars of Lebanon Picnic Grove, Sawmill Rd; I-95 N to I-295 S, Exit 60A to I-195 E, Exit 2 to Yardville, S Broad St to end, approximately 3.7 miles, left at Yield onto Old York Rd, next right onto Sawmill Rd, site is 1.1 miles on right. Tailgating ($10 per 8-ft space, includes 1 admission), ARRL table, free parking, refreshments. *TI:* 146.67 (131.8 Hz). *Adm:* $6, nonham spouses and children free. Tables: covered space $15 (includes 1 table and 1 admission; limited electricity, advance reservations available). Darryl Foyuth, N2JVP, c/o DVRA, Box 7024, W Trenton, NJ 08625-0024; 609-882-2240; **dfoyuth@juno.com**; **www.slac.com/w2zq**.

†**New Jersey (West Orange)—Apr 21**, 8:30 AM to 1:30 PM. *Spr:* Roseland RC - IRAC. West Orange High School, Pleasant Valley Way; Exit 7A off Interstate Rte 280. VE sessions. *TI:* 146.415 + 1 MHz (85.4 Hz), 447.875 (156.4 Hz). *Adm:* $5. Tables: $12 (first table); $9 each additional. James Howe, N2TDI, 5 Iroquois Ave, Lake Hiawatha, NJ 07034; 973-402-6066; **jimn2tdi@att.net**.

New Mexico (Albuquerque)—Apr 28. Chuck Opdyke, KC5GA, 505-858-0306.

New York (Owego)—May 5. Jack Connors, WB2GHH, 607-724-8822.

New York (Poughkeepsie)—Apr 29, Eastern New York Section Convention. See "Coming Conventions."

†**New York (Yonkers)—May 6**, 9 AM to 2 PM. *Spr:* Metro 70cm Network. Lincoln High School, Kneeland Ave; Exit 2 (N) NYS Thruway to Yonkers Ave, go W to St Johns Ave, left 2 blocks to Theresa Ave, right to Kneeland Ave. Giant indoor electronics flea market, vendors, free coffee. *TI:* 146.91, 440.425, 145.27. *Adm:* $6. Tables: $15 (admit 1 free for each table rented). Otto Supliski, WB2SLQ, 53 Hayward St, Yonkers, NY 10704; 914-969-1053; **wb2slq@juno.com**.

†**North Carolina (Morganton)—Apr 21**, 8 AM to 4 PM. *Spr:* Catawba Valley Hamfest Committee. Burke County Fairgrounds, Hwy 181 N; I-40, Exit 100, turn left on Jamestown Rd, make left at intersection of Hardee's and Bo Jangles, take right at next light at K-mart. Catawba Valley Hamfest and Computer Fair, flea market, dealers (Larry Withrow, AF4HX, 828-652-4195; **af4hx@worldnet.att.net**), forums (SKYWARN, PSK31, ARES), VE sessions (9 AM), refreshments. *TI:* 147.15, 146.745. *Adm:* advance $4, door $5. Tables: $10. Tom Taylor, KC4QPR, Box 8003, Morganton, NC 28680-8003, 828-433-6205; **kc4qpr@vistatech.net**; **cvhamfest.linuxham.org**.

†**Ohio (Athens)—Apr 29**. *Spr:* Athens County ARA. Athens Recreation Center, 733 E State St; US 33 or 50, Exit E State St, hamfest at 2nd light. Flea market, indoor exhibits, refreshments. *TI:* 145.15. *Adm:* $5, spouses free. Tables: advance $8 (if at least 1 week in advance), door $10. Drew McDaniel, W8MHV, 61 Briarwood Dr, Athens, OH 45701; 740-592-2106; **dmcdaniel1@ohiou.edu**.

†**Ohio (Canfield)—Apr 29**, 8 AM to 2 PM. *Spr:* Twenty Over Nine RC. MCCTC, 7300 N Palmyra Rd; 2 miles W of Square in Canfield, on US Rte 224. ARRL activities, VE sessions. *TI:* 147.315, 443.225. *Adm:* $5. Tables: 8-ft $10 (first-come, first-served). Don Stoddard, N8LNE, 55 S Whitney Ave, Youngstown, OH 44509; 330-793-7072; **N8LNE1@juno.com**.

†**Ohio (Coalton)—Apr 21**, 8 AM to 1 PM. *Spr:* Jackson County ARC. James H. Rhodes Community Center, located on State Rte 93 between Jackson and Wellston; from US 35, go N on SR 93 for 4 miles to Coalton, building on right as you go into town. Hamfest/Radio/Computer Show, flea market, vendors, VE sessions (10 AM, all classes of license, walk-ins welcomed), auction (following hamfest, for any items not sold), handicapped accessible, refreshments. *TI:* 146.79. *Adm:* $5. Tables: $5 (first-come, first-served basis; electricity available for a donation to Coalton Volunteer Fire Dept). Edgar Dempsey, KD8XL, 110 Morton St, Jackson, OH 45640-1335; 740-286-3239; **kd8xl@ohiohills.com**.

†**Pennsylvania (Washington)—Apr 29**, 8 AM to 3 PM. *Spr:* WACOM. Washington County Fairgrounds; Rte 79 S from Pittsburgh to Meadow Lands Exit, right to light, left to next light, right to stop sign, right to Fairgrounds. VE sessions (10 AM). *TI:* 145.49. *Adm:* $3. Tables: $8. Jim Burtoft, KC3HW, 71 Beagle Club Rd, Washington, PA 15301; 724-228-0546; **jbur@mlynk.com**.

†**Pennsylvania (Wrightstown/Bucks County)—May 6**, 6 AM to 1 PM. *Spr:* Warminster ARC. Middletown Grange Fairgrounds, Penns Park Rd; vicinity of Rtes 413 and 232, 25 miles N of Philadelphia. Tailgating ($8 in advance, $10 at the door), 80 indoor spaces with electricity, VE sessions, equipment check-out table, free parking, refreshments. *TI:* 147.09, 146.52. *Adm:* $6. Tables: advance $10, door $15. Tony Simek, N3YNH, 340 Centennial Rd, Warminster, PA 18974; 215-674-5218; **tsimek@aol.com**; **www.voicenet.com/~k3dn**.

Quebec (LaSalle)—Apr 21. James Hay, VE2VE, 514-697-7205.

South Carolina (Greenville)—May 5, South Carolina State Convention. See "Coming Conventions."

†**South Carolina (Windsor)—Apr 28**, 8 AM to 1 PM. *Spr:* Salkehatchie ARS. Windsor Community Center; take Hwy 78 to Windsor, turn left at Masonic Lodge, go 1/2 mile, turn right, follow signs. Tailgating, VE sessions, refreshments. *TI:* 147.03. *Adm:* Free. Tables: $5. Adam Hoffman, AF4QZ, Box 93, Bamberg, SC 29003; 803-245-4673; **af4qz@arrl.net**; **www.qsl.net/kf4cvo**.

Tennessee (Nashville)—Apr 20-21, Southeastern VHF Conference. See "Coming Conventions."

Texas (Abilene)—May 5-6, West Texas Section Convention. See "Coming Conventions."

†**Texas (Belton/Temple)—Apr 21**; set up 5:30-7 AM; public 7 AM. *Spr:* Temple ARC. Bell County Expo Center, from I-35 take Exit 292, go W to Center. Huge indoor tailgate arena ($10 per space; tables available for additional $10 each, free electricity; bring your own extension cords, outlet strips, duct tape), commercial vendors ($25 per space, includes table), auction, handicapped accessible. *TI:* 146.82 (123 Hz). *Adm:* $1. Mike LeFan, WA5EQQ, Box 4511, Temple, TX 76505; 254-773-3590; **hamexpo@tarc.org**; **www.tarc.org**.

†**Virginia (Chesapeake)—Apr 21**; set up 7-9 AM; public 9 AM to 2 PM. *Spr:* Chesapeake AR Service. Civitan Acres, 2210 Cedar Rd; I-64 to Exit 291 (Eliz City) to Rte 104, turn right on Cedar Rd, travel approximately 1.5 miles, site is between 2 small bridges, look for signs. Amateur Radio and Electronics Flea Market. *TI:* 146.82. *Adm:* $6, under 10 free (includes 1 flea market space until full). Tables: reserved for first 30 to register; everyone else bring your own. Richard Siff, WA4BUE, c/o CARS, Box 6867, Chesapeake, VA 23323-6867; 757-485-3762; **melody@infi.net**; **www.qsl.net/cars**.

†**Washington (Spokane)—Apr 7**; set up Friday 5-8 PM, Saturday 5:30-8:30 AM; public 9 AM to 5 PM. *Sprs:* Lilac City ARC and Lilac City Chapter 10-10 International. Spokane Community College, Lair Building, Greene St at Mission St; I-90, Exit 283 at College Exit signs. Flea market, electronics, computers, VE sessions (exams 1 PM; Bill Sullivan, AA7YJ, 509-838-4320), free parking, refreshments. *TI:* 146.52, 147.38. *Adm:* advance $4, door $5, under 13 free. Tables: 8-ft, $12. Warren Kelsey, KJ7BB, 1405 S Crestline, Spokane, WA 99203-3648; 509-534-8443.

Washington (Yakima)—Apr 21-22, Washington State Convention. See "Coming Conventions."

West Virginia (Gassaway)—Apr 14. Ed Messenger, N8OYY, 304-462-5312.

†**West Virginia (Ripley)—May 6**, 8 AM to 2 PM. *Spr:* Jackson County ARC. Ripley Middle School; from Charleston take I-77 to Exit 33, turn right off ramp, go straight to 2nd light, turn right at Klondyke Rd, go straight to left turn. Flea market, VE sessions. *TI:* 146.67. *Adm:* $4. Tables: $4. Valerie Hunter, KC8PPT, Box 62, Cottageville, WV 25239-0062; 304-372-9518; **salamander54_25239@yahoo.com**; **www.hamevents.com**.

†**Wisconsin (Cedarburg)—May 5**; set up 6:30 AM; public 8 AM to 1 PM. *Spr:* Ozaukee RC. Circle-B Recreation Center, intersection of Hwy 60 and County I; 20 mi N of Milwaukee, W of Grafton. Swapfest, VE sessions (exams 9 AM), refreshments. *TI:* 146.97, 146.52. *Adm:* $4. Tables: $5 (4-ft, limited power available on request). Send SASE to Gene Szudrowitz, KB9VJP, W55 N865 Cedar Ridge Dr, Cedarburg, WI 53012; 262-377-6792; **szudg@msn.com**; or Skip Douglas, 262-284-3271.

†**Wisconsin (Superior)—May 5**, 9 AM to 2 PM. *Spr:* Arrowhead RAC. Multi-Purpose Building, Head of the Lakes Fairgrounds; take I-35 (Duluth, MN) to US 2/Bong Bridge (goes to Superior, WI), left on Belknap, right on Tower, approximately 2 mi to Fairgrounds, turn left. VE sessions. *TI:* 146.94. *Adm:* $5. Bud Fisher, KB0SBL, 315 William St, Cloquet, MN 55720; 218-879-9284.

Attention All Hamfest Committees!

Get official ARRL sanction for your event and receive special benefits such as free prizes, handouts, and other support.

It's easy to become sanctioned. Contact the Convention and Hamfest Branch at ARRL Headquarters, 225 Main St, Newington, CT 06111. Or send e-mail to **giannone@arrl.org**. QST

VHF/UHF CENTURY CLUB AWARDS

Bill Moore, NC1L
Century Clubs Manager

The ARRL VUCC numbered certificate is awarded to amateurs who submit written confirmations for contacts with the minimum number of Maidenhead grid-square locators (indicated in *italics*) for each band listing. The numbers preceding the call signs indicate total grid squares claimed. The numbers following the call signs indicate the claimed endorsement levels. The totals shown are for credits given from December 19, 2000 to February 9, 2001. The VUCC application form, field sheets and complete list of VHF Awards Managers can be found on the Web at **www.arrl.org/awards/vucc/**. Please send an SASE if you cannot download the forms online. If you have questions relating to VUCC, send an e-mail to **vucc@arrl.org**.

50 MHz

100

1105	K7WV
1106	K7AD
1107	KD6RUH
1108	N0LIE
1109	KF6MXK
G8CDW	200
OK1MP	250
XE2EED	150
ZL3AAU	225
N0LL	750
WB0ULX	300
KA2GOJ	375
NJ2F (EL96)	325
N2WK	475
K3CWH	325
W4GLV	350
W4UDH	535
K4JAF	200
WA5JCI	650
W5TFW	150
WA5RT	425
W5TFW	150
WA6BYA	700

144 MHz

100

I1ANP	475
K9MRI	525

222 MHz

50

105	WB5AFY

2.3 GHz

10

WB5AFY	20

10 GHz

5

106	N6LL(DM04XF)
107	N6LL(DM04MS)
N6LL(DM04MS)	10

24 GHz

5

10	W5LUA

Satellite

100

96	W5BTS
97	K0SU
98	N5AFV
K5OE	405
KK5DO	475
N7SFI	700
K9HF	200

QST

CONTEST CORRAL

Feedback

In the **2000 September VHF QSO Party** results, Rick, N9MYK, was incorrectly identified as "Dick."

In the **2000 June VHF QSO Party** results, KB0LYL should be listed as first place in the 144 MHz Single-Operator Low-Power QSO leader box.

W1AW Qualifying Runs are 9 AM EDT, Tuesday, April 3, and 4 PM EDT, Wednesday, April 18. The K6YR West Coast Qualifying Run will be at 9 PM PDT on Wednesday, April 4. Check the W1AW schedule for details.

April

7-9

QCWA QSO Party, sponsored by Quarter Century Wireless Assn, from 1900Z Apr 7 until 1900Z Apr 8 (the second QCWA QSO Party of the year takes place 1800Z Oct 6 until 1800Z Oct 7). CW, phone or mixed-mode. Work stations on each of 15 possible "bands": 160, 80, 40, 20, 15, 10 meters CW and phone; 6 meters; 2 meters; 1.35 meters and 70 cm & up. Work stations in your own QCWA chapter only once. No crossband or repeater QSOs. QCWA members exchange call signs, the last two digits of the year first licensed, chapter number ("AL" if not a member of a chapter). Nonmembers exchange call signs, the last two digits of the year first licensed, and the state, province or country. Scoring: 1 pt per phone QSO, 2 pts per CW QSO. Count 1 multiplier for each QCWA chapter, plus each non-member state/province/country. Contacts with HQ station W2MM count as 3 multipliers per "band." Awards. All logs must be received no later than 1 month after contest. Send logs to: Dick Newsome W0HXL, 2924 North 48th St, Omaha, NE 68104-3726; **www.teleport.com/~qcwa/**.

EA RTTY Contest, sponsored by Union de Radioaficionados Espanoles, from 1600Z Apr 7 until 1600Z Apr 8. 80 40 20 15 10 meters, single op all band and single band, and multiop all band. Send RST and CQ Zone (EA stations send RST, province prefix). Everyone works everyone. Score 1 pt/QSO on 20 15 10 meters within own continent; 2 pts/QSO on 20 15 10 meters outside own continent; 3 pts/QSO on 80 & 40 meters within own continent; and 6 pts/QSO on 80 & 40 meters outside own continent. Contacts within your own DXCC country are valid for multipliers, but not for points. Final score is QSO points × DXCC entities (including EA, EA6, EA8, EA9) and EA provinces worked per band. Awards. Send logs by June 30 to EA RTTY Contest Manager, Antonio Alcolado, EA1MV, PO Box 240, E-09400 Aranda de Duero, Burgos, Spain; **ea1mv@retemail.es**.

SP DX Contest, sponsored by the Polski Zwiasek Krotkofalowcow (PZK), 1500Z Apr 7 to 1500Z Apr 8. Phone and CW, 160 80 40 20 15 10 meters. Single operator, all band or single band, mixed mode, phone only or CW only; multioperator (multiband, mixed mode only). Non-Polish stations send a RST and 3-digit QSO number. Polish stations send RST plus two-letter province designator. Work stations once per band and mode. Count 3 pts/SP-station QSO. Multipliers are provinces (49 max). Final score is QSO points × multipliers. Awards. Mail entries by Apr 30 to PZK, SPDX Contest Committee, PO Box 320, 00-950 Warszawa, Poland; **spdxc-logs@writeme.com**; **dendro.sggw.waw.pl/sp5zcc/spdxc/spdxc.htm**.

VHF/UHF Spring Sprints, sponsored by the East Tennessee DX Association. 144 MHz, 7 PM to 11 PM local time on Mon, Apr 9. (Other Spring Sprint dates are 222 MHz on Tue, Apr 17; 432 MHz on Wed, Apr 25; 902 MHz/1296 MHz/2304 MHz on Sat, May 5; and 50 MHz on Sat-Sun, 2300Z, May 12 to 0300Z May 13.) The 902 MHz, 1296 MHz, and 2304 MHz Sprints will run simultaneously on Sat, May 5, 6 AM to 1 PM local time; you may work any five consecutive hours during this time period. The 902, 1296 and 2304 MHz Sprints are separate, but run concurrently. The usual VHF/UHF rules apply. Exchange grid-square locations. Signal reports are optional. Score 1 pt per valid QSO. Final score is QSO pts × grid squares. Contests are separate; there's no accumulation of scores. Logs must indicate time, call sign and complete exchange for each valid QSO. Multipliers must be clearly marked in the log. Submit separate log and summary sheets for each Sprint entered. Awards. East Tennessee DX Assn, 1620 Hidden Hills Dr, Clinton, TN 37716; **vhfdx@etdxa.org**; **www.etdxa.org/**.

13-16

Japan International DX Contest, CW, high-band portion (20-10 meters), Apr 13 to Apr 14; see Jan *QST*, p 99.

Lighthouse Spring Lites Rites QSO Party, sponsored by the Amateur Radio Lighthouse Society (ARLHS) 2300Z April 13 to 0300Z April 23, Participants do *not* have to operate from lighthouses. All bands and all modes permitted, including PSK, repeaters and satellites, but excluding aeronautical mobile. Phone 1.970, 3.970, 7.270, 14.270, 21.370, 28.370; CW 1.830, 3.530, 7.030, 14.030, 21.030, 28.030. Exchange: Members send call, member number, name, and state/province/country; Lighthouse stations send call, ARLHS lighthouse number, name, state/province/country; Nonmembers send call, "ARLHS.COM," name, state/province/country. Score: 1 pt per QSO with Nonmember; 2 pts per QSO with member; 3 pts per QSO with lighthouse/lightship station. Contact with member at a lighthouse = 5 pts. Awards. Send logs by May 31 to Lee Graves, WA7OBH, Secretary ARLHS, 4341 SE Satinleaf Place, Stuart, FL 34997; **flgraves1@msn.com**; **arlhs.com**.

QRP ARCI Spring QSO Party, CW, sponsored by QRP ARC International, from 1200Z Apr 14 until 2400Z Apr 15. Single band, all band, high band (20 15 10 6 meters) or low band (160 80 40 meters). Operate 24 hours max. Work stations once per band. Send signal report, state/province/DXCC country and ARCI number (if member), or power output (if nonmember). 1.810 3.560 3.710 7.040 7.110 14.060 21.060 21.110 28.060 28.110 50.128. Score 5 pts/ QSO with ARCI member, 2 pts/QSO with nonmember on same continent and 4 pts/QSO for nonmember, different continent. Final score is QSO points × states/provinces/DXCC countries × power multiplier (0-250 mW, × 15; 250 mW to 1 W, × 10; 1-5 W output × 7; < 5 W × 1). Team competition. Awards. Mail entry (SASE for results) to QRP ARCI Contest Manager, Randy Foltz, K7TQ, 809 Leith St, Moscow, ID 83843; **rfoltz@turbonet.com**; **personal.palouse.net/rfoltz/arci/arcitst.htm**.

His Majesty the King of Spain Contest, sponsored by Union de Radioaficionados Espanoles, 1800Z Apr 14 to 1800Z Apr 15. Single operator, multioperator and SWL. Phone and CW are separate contests and require separate logs. 80 40 20 15 10 meters. Exchange RST and serial number, Spanish stations send RST and province. Count one point per QSO. NonSpanish stations can only work Spanish stations, Spanish stations work everyone. Multipliers are Spanish provinces on each band. Final score is total QSO points × total multipliers. Awards. Send logs by May 15 to URE Contest Manager, PO Box 220, 28080 Madrid, Spain; **ure@ure.es**; **www.ure.es/**.

DXYL-NAYL Contest, CW, sponsored by the YLRL, from 1400Z Apr 11 until 0200Z Apr 13 (phone contest is Apr 25-27). YLs only. SendRS(T), QSO no., and section/province/DXCC country. W/VE YLs work DX YLs, and vice versa. KL7 and KH6 count as DX. Work stations once per band. Score 1 pt/QSO. Multipliers are sections/provinces/DXCC countries, and count once. Stations running <150 W output (phone: 300W PEP) multiply score by 1.5. Final score is points × multipliers × power multiplier. Awards. Send logs within 30 days to Phyllis Shanks, W2GLB/7, 1345 W Escarpa, Mesa, AZ 85201-3853; **pshanks1@juno.com**; **www.qsl.net/~ylrl/ylcontests.html**.

Low Power Spring Sprint, sponsored by the Slovak ARA, 1400Z-2000Z Mon Apr 16. CW only, 160 80 40 20 15 10 meters on IARU recommended contest band segments. Single op only: single band, three bands, all bands. Exchange RST, Maidenhead grid square and power category (A = <1 W; C = <5 W; Q = <25 W; X = <50 W; Y = <100 W). Count 3 pts/QSO with own continent, 9 pts/QSO with other continents and 18 pts/QSO with OM stations. Multipliers are grid squares plus and prefixes (WPX rules) worked per band. Final score is QSO pts × multipliers. Send entries within 30 days to SS Contest, Radioclub OM3KFV, PO Box 129, 036 01 Martin 1, Slovakia.

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222 MHz Spring Sprint, see April 9.

21-22

Michigan QSO Party, sponsored by the Mad River Radio Club, from 1600Z April 21 until 0400Z April 22. Stations may operate the full 12 hours. Phone and CW on 80/40/20/15/10 meters. Single-op, multiop, and mobile categories. Work stations once per band and mode. MI-to-MI QSOs allowed. Work portables and mobiles again as they change county, state or province. Exchange QSO number and location (county for MI stations, state/province or "DX" for others). Suggested frequencies: CW-3545, 7045, 14045, 21045, 28045; Phone-3850, 7225, 14250, 21300, 28450. One point per phone QSO, two points per CW QSO. Count multipliers once per mode. Multipliers are MI counties for all entries, plus states & provinces for MI entries only. Final score is total QSO points × total multipliers. Mail logs no later than 30 days after the contest to: Mad River Radio Club, c/o Dave Pruett, 2727 Harris Rd, Ypsilanti, MI 48198; **MQP@contesting.com**; **www.qsl.net/mrrc/mqp.html**.

Ontario QSO Party, sponsored by the Ontario DX Association, 1800Z Apr 21 to 1800Z Apr 22. Phone and CW, 160 80 40 20 15 10 meters and all VHF/UHF bands (no repeater QSOs and keep 146.52 MHz clear). Categories: Single operator low power (<150 W on HF and <50 W on VHF/UHF); single operator high power; single operator, single and mobile; HF QRP (<5 W); VHF/UHF FM QRP (<5 W); multioperator; CW, SSB or mixed mode. Exchange signal report state/province/DXCC country. Ontario stations exchange signal report and county/district/regional municipality. Work Ontario stations only (Ontario stations work everyone). Work mobile and rover stations again as they change county/district/regional municipalities. Work stations once per band. Count 1 pt/HF SSB, 2 pts/HF CW, 5 pts/contacts on VHF/UHF bands, 10 pts (each band) for working VE3ODX and VA3RAC. Multipliers are Ontario county/district/regional municipalities (for Ontario stations: county/district/regional municipalities, and state/province/DXCC countries) worked on each band. Final score is total QSO points × total multipliers worked (max 48). Awards. Send logs by May 31 to Ontario DX Association, Box 161, Stn A, Willowdale, ON M2N 5S8 Canada; **ve3sre@rac.ca**; **www.odxa.on.ca/oqphome.html**.

The TARA PSK31 Rumble (The Spring Wakeup). Sponsored by Troy ARA, 0000-2400Z Apr 21, PSK only. 80 40 20 15 10 6 meters. Work stations once per band. Exchange name, state/province/DX send DXCC prefix. Operate 1 of 6 categories: Club Challenge (whatever it takes to win!); Normal (100 w max); Great (20 W max); Super, 5 W max); Novice or SWL. Final score is QSOs × (W + VE + JA + VK call areas + 1 point per DX incl. your own). Multipliers count once per band. To be valid, scores must be received via our

George Fremin III, K5TR ♦ 624 Lost Oak Trail, Johnson City, TX 78636 ♦ k5tr@arrl.org

online score submission form found at www.qsl.net/wm2u/score.html. You can also e-mail Logs to wm2u@n2ty.org, by May 19.

Holyland DX Contest, sponsored by the Israel ARC, from 1800Z Apr 21 until 1800Z Apr 22. 160 80 40 20 15 10 meters. Single op all band (mixed, CW or Phone), multi-single and SWL. Send RS(T) and serial number (Israeli stations send RST and area). Work Israeli stations only. Work stations once per band and mode; no crossband or crossmode contacts. Score 2 pts/QSO on 160 80 40 meters, and 1 pt/ QSO on 20 15 10. Final score is QSO points × Israeli areas worked per band. Awards. Send logs by May 31 to Israel ARC, PO Box 17600, Tel Aviv 61176, Israel; hamradio.iarc.org/main.html.

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432 MHz Spring Sprint, see April 9.

DXYL-NAYL Contest, Phone, see April 13-16

28-29

Florida QSO Party, sponsored by the Florida Contest Group, 1600Z Apr 28 to 0159Z Apr 29 and 1200Z-2159Z Apr 29. 20 hours total time. 40 20 15 10 meters. Categories: single op, mobile (single op or multiop), Technician (mixed mode, phone only, CW only); multi-single and multi-multi (mixed mode only; max 1 signal per band); school (university, college, high school, etc). Three power classes for all categories: QRP (<5 W), low power (<150 W) and high power (>150 W). Exchange signal report and state/province (DX stations send DX); Florida stations send county. Work stations once per band and mode. Work Florida mobile stations again as they change county. Count 1 pt per phone QSO, 2 pts per CW QSO. Multipliers: for Florida stations, all 50 states and all Canadian provinces; DXCC entities (except W, VE, KH6, KL7). All others count Florida counties (67). Count multipliers once per mode. Final score: Multiply QSO points by total multipliers by the power multiplier (<5 W, × 3; <150 W, × 2; >150 W, × 1). Logs must be postmarked by May 29. Send your entry to Florida QSO Party, c/o Ron Wetjen, WD4AHZ, 5362 Castleman Dr, Sarasota, FL 34232; FLQSOParty@aol.com; www.qsl.net /fqp/.

Nebraska QSO Party, sponsored by the Nebraska QSO Party Group, from 1700Z Apr 28 until 1700Z Apr 29. Single op, multi-single, mobile and Technician. Send RS(T) and state/province/DXCC country (NE stations send county). Work stations once per band and mode. CW—1.805 and 60 kHz up from band edge; phone—1.865 3.860 7.260 14.260 21.360 28.360 146.46; Technician—28.380 and 10 kHz up from band edge. Score 1 pt per phone, 2 points per CW QSO. NE mobiles may add 50 QSO pts for each county operated from; NE portables may add 100 QSO pts for each county operated from (excluding county of residence). Work mobiles/portables again as they change county. Final score is QSO points × power multiplier x NE counties (max 93); NE stations multiply by states (50), provinces (8) and DXCC countries (max 35) for a possible maximum of 93. Power multiplier is based on transmitter power output. If all QSOs are made using 5 W or less, multiply QSO points by 3; using less than 150 W, multiply by 2; using more than 150 W, multiply by 1. Club Competition (3 entries min). Awards. Send logs by May 31 to Nebraska QSO Party, PO Box 375, Elkhorn, NE 68022-0375; hdxa@qsl.net; www.qsl.net/hdxa/neqso/neqso.htm.

Six Meter Sprint, sponsored by Six Club, 2300Z Apr 28 to 0400Z Apr 29, 6 meters only. Exchange grid square. Count 1 point for each QSO in your country and 2 points for QSOs outside your country. Hawaii and Alaska are separate countries. Final score is total QSO points × total number of grid squares worked. Awards. Send logs before May 27 to Six Club, PO Box 307, Hatfield, AR 71945; sixclub@6mt.com; 6mt.com/contest.htm. QST

SPECIAL EVENTS

Patuxent River, MD: NAS Patuxent River Military Recreation Station, K3NAL, 1300-2300Z **Apr 1**, celebrating the 58th anniversary of the commissioning of the Patuxent River Naval Air Station. 28.450, 21.350, 14.275, 7.275. Certificate. K3EZ, 41389 Richneck Court, Mechanicsville, MD 20659.

Port St Lucie, FL: PSLARA, K4PSL, 1700-2100Z **Apr 1** to **Apr 14**, commemorating the discovery of Florida by Ponce De Leon on April 2, 1513. 14.050 14.230 21.230 28.350. Certificate. Dr Maurice I. Sasson, W2JAJ, 8598 Florence Dr, Port St. Lucie, FL 34952.

Peoli, OH: Tusco Amateur Radio Club, W8ZX, 1501Z **Apr 2** to 0400Z **Apr 3**, operating from Cy Young's hometown on the opening day of baseball season. 3.932 7.257 14.250 28.450. QSL. Tusco Amateur Radio Club, 3015 Larson Road SE, Uhrichsville, OH 44683.

Gloucester, VA: Middle Peninsula Amateur Radio Club, W4HZL, 1300-2100Z **Apr 7**, during the 15th annual Gloucester County Daffodil Festival. 7.237 14.237 21.370 28.370. QSL. Carter Clements, AD4VQ, HC 74 Box 1680, Shacklefords, VA 23156.

New Orleans, LA: Jefferson Amateur Radio Club, W5GAD, 1750-2250 **Apr 7**, operating from the Mississippi River steamboat *Natchez*. 14.260 21.360. QSL or certificate ($1.50 donation requested for certificate). Jefferson Amateur Radio Club, PO Box 73665, Metairie, LA 70033.

Peekskill, NY: Peekskill/Cortlandt Amateur Radio Association, W2NYW, 1300-2100Z **Apr 7** to celebrate PCARA's 1st anniversary. 14.245 21.375 28.350 7.260. Certificate. PCARA, PO Box 32, Crompond, NY 10517.

Pine Bluff, AR: Pine Bluff Amateur Radio Club, K5DAK, 1500-2100Z **Apr 7** celebrating the annual Railroad-a-Rama. 14.250. Certificate. Pine Bluff ARC, PO Box 1402, Pine Bluff, AR 71613.

Norfolk, VA: USS *Wisconsin* Radio Club, N4WIS, 1400Z **Apr 16** to 0300Z **Apr 17**, for opening day of tours aboard the battleship *Wisconsin* at the Nauticus National Maritime Center. 7.035 7.235 14.035 14.235. QSL. Carey Brown, KT4P, 4821 Rosecroft St., Virginia Beach, VA 23464.

Pineville, LA: Central Louisiana Amateur Radio Club, W5B, 0001Z **Apr 19** to 2400Z **Apr 30**, for the 60th anniversary of the Louisiana Military Maneuvers Museum. 3.875 7.235 14.225 . Certificate. Ed Crump Jr, PO Box 1910, Alexandria, LA 71309.

Jefferson City, MO: Mid-Missouri ARC, K0C, 1500Z **Apr 20** to 0400Z **Apr 21**, celebrating Earth Day in Missouri from the grounds of the Missouri state capitol. (37 kHz up on CW) 7.237 14.323 14.037 28.423. Certificate. Eric Raub, NM0X, 1115 D Charm Villa Drive, Jefferson City, MO 65109.

Gainesville, FL: Gainesville Amateur Radio Society, K4GNV, 1300-2000Z **Apr 20** and **Apr 21**, commemorating the 3rd annual North Central Florida Hurricane Response Exhibition. 7.260 14.240 21.335 28.465. QSL (with SASE). K4GNV, PO Box 140383, Gainesville, FL 32614-0383.

Las Vegas, NV: The Silverdust Amateur Radio Association of Nevada, N7A, 2000Z **Apr 21** to 1900Z **Apr 22**, celebrating the 5th anniversary of the Extra Terrestrial Highway—NV state highway 375—gateway to Area 51. 7.260 14.237 21.371 29.250. Certificate. SARAN, PO Box 9717, Las Vegas, NV 89191-0717.

Plymouth, MI: Stu Rockafellow ARS, N8D, 1300Z **Apr 21** to 2000Z **Apr 22**, commemorating Jimmy Doolittle's B-25 raid. 7.270 14.270 21.370 28.370. Certificate. Chuck VanVleck, 42350 Ann Arbor Road, Plymouth MI, 48170.

Piscataway, NJ: Piscataway Amateur Radio Club, K2VOA, 0000Z **Apr 21** to 2400Z **Apr 22**, at Voice of America relay station WBOU. 7.275 14.275 21.345 28.445. Certificate. Piscataway Amateur Radio Club, PO Box 1233, Piscataway, NJ 08854.

Blacksburg, VA: Virginia Tech Amateur Radio Association, K4KDJ, 1300Z **Apr 28** to 2200Z **Apr 29**, conducting the annual VT Alumni Net celebrating VT Founders Day. 14.242 7.242 28.460 7.041. Certificate. VTARA, 347 Squires Student Center, VPI&SU, Blacksburg, VA 24060-0546.

Goshen, IN: Goshen Amateur Radio Club, K9WJU, 1500-2100Z **Apr 28**, operating at the Goshen College Ethnic Fair. 14.250 21.350. Certificate. George Vasbinder, 2607 Martin Manor Drive, Goshen, IN 46526.

Camdenton, MO: Westside Hamsters ARC, KC0FSV, 1500-2200Z **Apr 28**, during the annual Dogwood Festival. 28.350 14.250. Certificate. Westside Hamsters ARC, PO Box 1451, Laurie, MO 65038.

Mississauga, ON: Mississauga Amateur Radio Club, VE3RCX, 0200-0600Z **Apr 28**, during the AGGIE Canadian Girl Guide Convention. 3.740 7.090 14.135. QSL. Michael Brickell, VE3TKI, 2801 Bucklepost Crescent, Mississauga, ON, Canada L5N 1X6.

Bakersfield, CA: Bakersfield Amateur Radio Association, W6BAR, 1800-2200Z **Apr 28**, during the walk-a-thon for the Children Miracle Network. 28.460 14.260 7.260 147.480. Certificate. BARA, PO Box 80222, Bakersfield, CA 93380.

Manitowoc, WI: Mancorad Radio Club, W9DK, 1400Z **Apr 28** to 2300Z **Apr 29**, aboard the USS *Cobia* during the Sub Memorial Radio Reactivation. 7.243 14.243 21.343 28.343. Certificate. Fred Neuenfeldt, W6BSF, 4932 South 10th St, Manitowoc, WI 54220.

Rockville, MD: Montgomery Amateur Radio Club, N3S, 1600-2100Z **Apr 29**, for the Rockville Science Fair. 146.955. QSL. N3S—Rockville Science Fair, Montgomery Amateur Radio Club, PO Box 611, Gaithersburg, MD 20884-0611.

Wells County, IN: Grant County Amateur Radio Club, W9EBN, 1700-2200Z **Apr 29**, during the McNatt United Methodist Church Ham Sunday Fellowship Event. 7.255 14.255 28.410 146.79. Certificate. L. B. Nickerson, K9NQW, 517 N Hendricks Ave, Marion, IN 46952. QST

George Fremin III, K5TR ♦ 624 Lost Oak Trail, Johnson City, TX 78636 ♦ k5tr@arrl.org

2001 IARU HF World Championship Rules

1. Eligibility: All licensed amateurs worldwide.

2. Object: To contact as many other amateurs, especially IARU member society HQ stations, around the world as possible using the 160, 80, 40, 20, 15 and 10 meter bands.

3. Date and Contest Period: The second full weekend of July**, beginning 1200 UTC Saturday and ending 1200 UTC Sunday (July 14-15, 2001)**. Both Single and Multioperator stations may operate the entire 24-hour period.

4. Entry Categories:

4.1 Single Operator

4.1.1. Categories

4.1.1.1. Phone only

4.1.1.2. CW only

4.1.1.3. Mixed mode

4.1.2. One person performs all operating and logging functions.

4.1.3. Use of spotting nets or packet is not permitted.

4.1.4. All operators must observe the amateur radio regulations of their country at all times.

4.1.5. Single operator stations are allowed only one transmitted signal at any given time.

4.2. Multi Operator, Single Transmitter, Mixed Mode only

4.2.1. Must remain on a band and mode for at least 10 minutes before changing bands or modes. The ten-minute period begins with your first QSO on the new band or mode.

4.2.2. Only one transmitted signal is allowed at any given time.

4.2.2.1. Exception: Only IARU member society HQ stations may operate simultaneously on more than one band, with one transmitter on each band and mode.

4.2.2.2. Only one HQ station call sign per member society per frequency band/mode is permitted.

4.2.3. All operators must observe the Amateur Radio regulations of their country at all times.

5. Contest Exchange:

5.1. IARU member society HQ stations send signal report and official IARU member society abbreviation. IARU International Secretariat Club Station NU1AW counts as a HQ station. Members of the IARU Administrative Council and the three IARU regional Executive committees send "AC," "R1," "R2" and "R3" as appropriate.

5.2. All others send signal report and ITU zone.

5.3 A complete exchange must be logged for each valid QSO.

6. Valid Contact:

6.1. The same station may be worked once per mode per band for QSO credit.

6.1.1. Mixed-mode entries may work a station once per mode per band.

6.2. A station may only be worked for credit in the portion of the band that is generally accepted for the mode used.

6.2.1. On any band, a station may be worked once on phone (in the phone segment) and once on CW (in the CW segment).

6.2.2. Cross mode, cross band and repeater contacts are not valid QSOs.

6.3 Where contest-preferred segments are incorporated in regional band plans, participants should observe them.

6.4 The use of nonamateur radio means of communications (eg, telephone or the Internet) for the purpose of soliciting a contact (or contacts) during the contest period is inconsistent with the spirit and intent of these rules.

6.5 Active use of packet (ie, "please come work me" or other self-spotting techniques) is inconsistent with the spirit and intent of these rules.

7. QSO Points:

7.1. Contacts within your own ITU zone, as well as QSOs with stations sending "AC," "R1," "R2," and "R3" or any IARU member society HQ stations, count one point.

7.1.1. Contacts with a station in the same ITU zone but on a different continent count one point.

7.2. Contacts within your continent (but outside your ITU zone) count three points.

7.3. Contacts with a different continent and ITU zone count five points.

8. Multipliers: The total number of ITU zones plus IARU member society HQ stations worked on each band (not mode). IARU officials represent a maximum of four multipliers per band (AC, R1, R2 and R3).

8.1. IARU member society HQ stations and officials do not count for zone multipliers.

9. Scoring: The total number of QSO points times the total number of multipliers worked.

10. Reporting:

10.1. **Entries must be postmarked or e-mailed no later than 30 days after the end of the contest (August 14, 2001).** No late entries can be accepted.

10.2. **Electronic entries must conform to the Cabrillo file format.**

10.2.1. **The Cabrillo file format and specifications may be found at** www.kkn.net/~trey/cabrillo/ **or in the November 1999 issue of *QST* magazine**.

10.2.2. Any entry which has been generated using a computer (either during the contest or after the contest) must be submitted either as an attachment to an e-mail or on a 3.5-inch diskette.

Prefix, Continent and ITU Zone

1A0	EU	28	8Q	AS,AF	41	CT3	AF	36	FT5X	AF	68	KH8	OC	62	T30	OC	65	VK0(H)	AF	68
1S	AS	50	8R	SA	12	CU	EU	36	FT5Z	AF	68	KH9	OC	65	T31	OC	62	VK0(M)	OC	60
3A	EU	27	9A	EU	28	CV-CX	SA	14	FW	OC	62	KL	NA	1, 2	T32	OC	61, 63	VP2	NA	11
3B6-9	AF	53	9G	AF	46	CY	NA	09	FY	SA	12	KP1-5	NA	11	T33	OC	65	VP5	NA	11
3C	AF	47	9H	EU	28	D2, 3	AF	52	G-GX, M-MX	EU	27	LA-LN	EU	18	T5	AF	48	VP8(F)	SA	16
3C0	AF	52	9I-9J	AF	53	D4	AF	46	H4	OC	51	LO-LW	SA	14, 16	T7	EU	28	VP8	SA	73
3D2	OC	56	9K	AS	39	D6	AF	53	H40	OC	51	LX	EU	27	T9	EU	28	VP9	NA	11
3D2(R)	OC	56	9L	AF	46	DA-DL	EU	28	HA, HG	EU	28	LY	EU	29	TA-TC	EU/AS	39	VQ9	AF	41
3D2(C)	OC	56	9M2, 4	AS	54	DU-DZ	OC	50	HB, HE	EU	28	LZ	EU	28	TF	EU	17	VR6	OC	63
3DA	AF	57	9M6, 8	OC	54	E3	AF	48	HC, HD	SA	12	OA-OC	SA	12	TG, TD	NA	11	VR2	AS	44
3V	AF	37	9N	AS	42	E4	AS	39	HH	NA	11	OD	AS	39	TI, TE	NA	11	VU	AS	41, 49
3W, XV	AS	49	9Q-9T	AF	52	EA-EH	EU	37	HI	NA	11	OE	EU	28	TJ	AF	47	XA-XI	NA	10
3X	AF	46	9U	AF	52	EA6-EH6	EU	37	HJ-HK	SA	12	OF-OI	EU	18	TK	EU	28	XA4-XI4	NA	10
3Y	AF	67	9V	AS	54	EA8-EH8	AF	36	HK0(M)	NA	12	OH0	EU	18	TL	AF	47	XT	AF	46
3Y(P)	AN	72	9X	AF	52	EA9-EH9	AF	37	HK0	NA	11	OJ0	EU	18	TN	AF	52	XU	AS	49
R1MV	EU	29	9Y-9Z	SA	11	EI-EJ	EU	27	HL, DS	AS	44	OK-OL	EU	28	TR	AF	52	XW	AS	49
R1FJ(FJL)	EU	75	A2	AF	57	EK	AS	29	HO-HP	NA	11	OM	EU	28	TT	AF	47	XX9	AS	44
4K	AS	29	A3	OC	62	EL	AF	46	HQ-HR	NA	11	ON-OT	EU	27	TU	AF	46	XY-XZ	AS	49
4L	AS	29	A4	AS	39	EP-EQ	AS	40	HS, E2	AS	49	OX	NA	5, 75	TY	AF	46	YA	AS	40
4P-4S	AS	41	A5	AS	41	ER	EU	29	HV	EU	28	OY	EU	18	TZ	AF	46	YB-YH	OC	51, 54
4U(ITU)	EU	28	A6	AS	39	ES	EU	29	HZ	AS	39	OZ	EU	18	RA-RZ, UA-UI	EU/AS	19-26, 29-35, 75	YI	AS	39
4U(UN)	NA	08	A7	AS	39	ET	AF	48	I,IS0,IM0	EU	28	P2	OC	51				YJ	OC	56
4W	OC	54	A9	AS	39	EU, EV, EW	EU	29	J2	AF	48	P4	SA	11				YK	AS	39
4X, 4Z	AS	39	AP-AS	AS	41	EX	AS	30, 31	J3	NA	11	PA-PI	EU	27	UJ-UM	AS	30	YL	EU	29
5A	AF	38	BV	AS	44	EY	AS	30	J5	AF	46	PJ2, 4, 9	SA	11	UN-UQ	AS	30, 31	YN	NA	11
5B	AS	39	BV9P	AS	44	EZ	AS	30	J6-8	NA	11	PJ5,6,7,8	NA	11	UR-UZ,EM-EO	EU	29	YO-YR	EU	28
5H-5I	AF	53	BY, BZ, BT	AS	33, 42, 43, 44	F	EU	27	JA-JS, 7K-N	AS	45	PP-PY	SA	12,13, 15				YS	NA	11
5N-5O	AF	46				FG	NA	11	JD(Minami)	OC	90				V2-4	NA	11	YT, YU, YZ	EU	28
5R-5S	AF	53	C2	OC	65	FJ, FS	NA	11	JD (Ogasawara)	AS	45	PY0	SA	13	V5	AF	57	YV-YY	SA	12
5T	AF	46	C3	EU	27	FH	AF	53	JT-JV	AS	32, 33	PY0(T)	SA	15	V6-7	OC	65	YV0	NA	11
5U	AF	46	C5	AF	46	FK	OC	56	JW	EU	18	PZ	SA	12	V8	OC	54	Z2	AF	53
5V	AF	46	C6	NA	11	FK/C	OC	56	JX	EU	18	S0	AF	37	VE,VA,VO, VY	NA	2-4, 9, 75	Z3	EU	28
5W	OC	62	C8-9	AF	53	FM	NA	11	JY	AS	39	S2	AS	41	VK	OC	55, 58, 59	ZA	EU	28
5X	AF	48	CA-CE	SA	14, 16	FO (Clip)	NA	10	K,W,N, AA-AK	NA	6, 7, 8	S5	EU	28				ZB	EU	37
5Y-5Z	AF	48	CE0A	SA	63	FO	OC	63	KG4	NA	11	S7	AF	53				ZC4	AS	39
6V-6W	AF	46	CE0X	SA	14	FO(Austral)	OC	63	KH0	OC	64	S9	AF	47	VK(LHI)	OC	60	ZD7-9	AF	66
6Y	NA	11	CE0Z	SA	14	FO (Marqueses)	OC	63	KH1	OC	61, 62	SA-SM	EU	18	VK9(W)	OC	55	ZF	NA	11
7O	AS	39	CM, CO	NA	11	FP	NA	09	KH2	OC	64	SN-SR	EU	28	VK9(X)	OC	54	ZK1-3	OC	62
7P	AF	57	CN	AF	37	FR	AF	53	KH3-7	OC	61	ST	AF	47, 48	VK9(C, K)	OC	54	ZL-ZM	OC	60
7Q	AF	53	CP	SA	12, 14	FR/T	AF	53				SU	AF	38	VK9(M)	OC	56	ZP	SA	14
7T-7Y	AF	37	CT	EU	37	FT5W	AF	68				SV-SZ, J4	EU	28	VK9(N)	OC	60	ZR-ZU	AF	57
8P	NA	11										T2	OC	65				ZS8	AF	57

10.2.3. Electronic files must use the entrant's call sign as the file name.

10.2.4. The log file must be a chronological list of QSOs as made, not separated by band or mode.

10.2.5. Entries sent as attachments to e-mail must be sent to **IARUHF@iaru.org**.

10.2.6. Entries sent on diskette should be mailed to: IARU HF Championship, IARU International Secretariat, Box 310905, Newington, CT 06111-0905 USA.

10.2.6.1. Diskettes must be clearly labeled with the station call sign, contest name, entry class and date.

10.3. Paper logs must be in chronological order, not separated by bands, and clearly indicate for each contact: band, mode, date, time (in UTC) call signs, complete exchanges sent and received, multipliers and QSO points.

10.3.1. Multipliers should be marked in the paper log only the first time they are worked on each band.

10.3.2. Paper logs with more than 500 QSOs must include dupe sheets.

10.3.3. Paper logs must be mailed to IARU International Secretariat, Box 310905, Newington, CT 06111-0905 USA and postmarked no later than the deadline. Entries that are received after mid-October, 2001, even if mailed in time, may not be received in time to be included in the official results.

10.4. All paper entries must include an official summary sheet or reasonable facsimile thereof with complete contest information.

11. Awards:

11.1. A certificate will be awarded to the high scoring entry in each category in each US state, each ITU zone and each DXCC country.

11.2. Certificate will be awarded to the highest scoring IARU member society HQ station.

11.3. Achievement level awards will be issued to those making at least 250 QSOs or having a multiplier total of 50 or more.

11.4 Additional awards may be made at the discretion of each country's IARU member society.

12. Conditions of Entry: Each entrant agrees to be bound by the provisions of this announcement, by the regulations of his/her licensing authority, and by the decisions of the ARRL Awards Committee, acting for the IARU International Secretariat.

13. Disqualification: Any entry may be disqualified if the overall score is reduced by more than 2%. Score reductions do not include correction of arithmetic errors. Any entry may be disqualified if more than 2% of duplicate QSOs are left in the log. A three-QSO reduction will be assessed for each duplicate QSO found during log checking or for miscopied call signs.

14. For contest information, contact **n1nd@iaru.org** or IARU HF Contest Information, PO Box 310905, Newington, CT 06111-0905 USA.

14.1. Contest forms may be downloaded at: **www.iaru.org/contest.html**. QST

Straight Key Night 2001

Celebrating the new millennium in style!

"Having the chance to hear each fist makes it easy to recognize former contacts and you don't have to wait for a call sign"—AA9DH

Back in my early days as a Novice, you could find me checking into several of the once numerous Novice training nets almost any evening. You quickly learned the rhythmic styles of the individual operators. A long, drawn-out "C" announced that Anita was on frequency. A short, peppy "hi" was the trademark of Max. A good net control station would instantly know which of the regulars was checking in by simply hearing one or two letters and recognizing their distinctive "accents."

Since its inception back in 1970, Straight Key Night has presented hams a chance to kick back and enjoy a favorite part of the hobby in a low-key, relaxed atmosphere. The purpose of SKN isn't to rack up hundreds of contest-style contacts. Rather, it is to demonstrate your personal style of sending Morse code the old-fashioned way: by hand.

Perhaps SKN2001 took on special meaning, as it was the first official operating event of the Third Millennium. Maybe nostalgia waxed poetically across the airwaves. Whatever the reason, a record number of entries were received for this year's event. A total of 138 logs were received from participants that represented 1346 QSOs. Looking at the various call signs in those logs, it is easy to see that many more stations participated, but did not submit an official entry to the League.

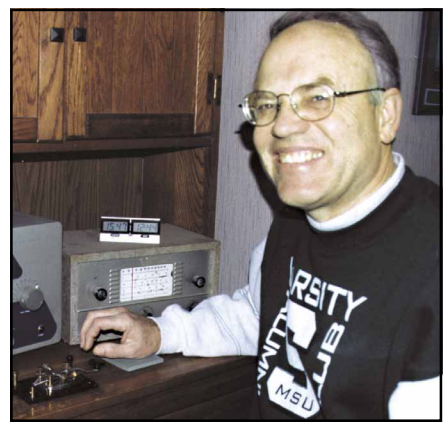
Ninety different stations received votes for Best Fist. WA8DXB and K9JXW tied with three votes each for top place in the competition. Seventy-three stations received votes for Most Interesting QSO. W0FCL, K2RSK, KD5JOM, W2NTS and W7ZMD each received two votes in the category.

W8DO chimed in with 51 SKN QSOs while K9JXW reported 49 followed by N3RSD with 44 and WA8DXB with 40. Popular in this year's SKN the ARRL Rag Chewer's Club Award. The "Old Sock" himself was busy signing certificates as 30 stations applied for membership in the RCC based on contacts from SKN 2001.

Judging from the soapbox comments, SKN continues to be a wonderful blend of experienced operators having fun, and new operators capturing some of the spirit of the day. SKN 2002 promises to be a renewal of the old-time magic of brass meeting brass. Why not try it next New Year's Day? QST

2001 Logs received from the Folllowing Participants:

AA7EH, AA9DH, AB5XP, AB5YY, AB8FJ, AD6GI, HP1AC, K1FP, K2GBH, K2NV, K4JSI, K4TP, K4TWJ, K5OI, K5RB, K6ETM, K6HRT, K6PBQ, K7FD, K7JIZ, K7ZYV, K8AB, K8KTY, K8PUJ, K8QLM, K8XF, K9JXW, K9KEU, K9SB, K9VKY, KA7T, KB2QIU, KB7BIY, KB8PGW, KD1XU, KD5CTJ, KD5OJM, KE3C, KF5ND, KG2OR, KG4FXG, KJ6CA, KK5FX, KN6YD, KO6YG, KS4RX, KV4EE, KW4JS, K0CDJ, K0HT, K0LWV, N1SKM, N2CG, N2KZ, N3MVX, N3RSD, N4BP, N4KN, N4QX, N5AE, N5BF/6, N5SR, N7CQR, N8KC, N9EXY, N9KO, N9SE, NA8P, NM0L, NN7A, NO7UP, NV4T, OH3WD, ON6ZJ, VE3GMC, VE3KHZ, W1LIC, W1QF, W1RO/7, W1TPB, W1TS, W1TW, W1YT, W2LID, W2VMX, W2ZP, W3CEI, W3KSQ, W3TZW, W3UHP, W4AGI, W4IT, W4QBE, W4SEA, W4STX, W5KL, W5MJ, W5USJ, W5WAX, W6BNB, W6PRI, W6SGJ/7, W6TDP, W6VNR, W6YQQ, W7BMI, W7EBQ, W7HB, W7LBV, W7TVI, W7YS, W7ZMD, W8DO, W8FEJ, W8JZI, W8WTS, W9ZC, WA1RGS, WA2QQF, WA5BDU, WA5CSH, WA7GSN, WA8DXB, WA9PWP, WA9QWX, WB3DSJ, WB4FSF, WB8QXL, WB8RRQ, WB9MII, WD0HSP, WK0B, WN8VIX, WO3B, W0AP, W0CZ, W0FCL, W0LQ



W8DO cracks a big smile as TA3DD answers his CQ SKN on 10 meters.

SECTION NEWS

The ARRL Field Organization Forum

ATLANTIC DIVISION

DELAWARE: SM, Randall Carlson, WB0JJX—Many thanks to those that participated in the Delaware QSO party. I think a good time was had by all. The QSO party is an excellent time to get on the air and to let folks know that Delaware does have ham radio activity. If you did not participate this year, consider doing so next year. I think you will enjoy it. Operating events like this are important to our hobby. To me one of the best things we can do to ensure the existence of Amateur Radio in the future is to make sure we are active participants today, not just someone that sits on the sidelines. It's a fact the more we use the privileges and opportunities available to us, the more we will be able to show their worth to the public. And the more worth we show, the better we will be to defend our frequency allocations and justify our existence. 73, Randall Carlson.

EASTERN PENNSYLVANIA: SM, Eric D. Olena, WB3FPL – SEC: Michael O. Miguelez, N3IRN. ACC: Steve Maslin, N3ORH. PIC: Robert Josuweit, WA3PZO. OOC Alan Maslin, N3EA. STM: Paul Craig, N3YSI. SGL: Allen Breiner, W3ZRQ. TC: Lawrence Thomas, AA3PX. ASMs: Robert Josuweit, WA3PZO, Dave Heller, K3TX, George Law, N3KYZ, James E. Bear, WB3FQY, Harry Thomas, W3KOD, Paul Craig, N3YSI. Congratulations to two new OES appointees in Chester County. Guy Battle, N3MXB, and Cullen Langford, K5HAL. I am sure their willingness to help will be an asset to an already great program. Speaking of appointments we are still looking to fill several vacancies. The E. Pa. Section needs a Bulletin Manager. We also need two DECs. District 1 comprised of Philadelphia, Delaware, Chester, Montgomery and Bucks Counties. District 5 comprised of Dauphin, Cumberland, Adams, York, Lancaster, Perry and Juniata Counties. ECs are needed in Adams, Dauphin, Perry, Tioga, Bradford, Carbon, Lackawanna and Wyoming Counties. Interested persons should contact any of the above listed cabinet members. Applications for appointments are also available on the ARRL Web site. The following are officers for several E. Pa. clubs for 2001. Delaware-Lehigh Amateur Radio Club, President Don Reamer, KA3JWE, Vice President Jeff Keller, N3QZT, Secretary Jill Brodt N3ZSR, Treasurer Dick Dech KA3MOU. Reading Radio Club, President Harry Hoffman, W3VBY, Vice President Art Becker, W3JZN, Secretary Al Brailer, W3UQC, Treasurer Dave Hill, W3DWH. Susquehanna Valley Amateur Radio Club, President Doug Wood WA3NLA, Vice President Chris Snyder NG3F, Secretary Dave Welker K3SI, Treasurer Bob Goodspeed, WB3HML and Activities Director Tom Shambach, N3LEP. Tamaqua Wireless Association, President Al W3ZRQ, Vice President Ron KB3CFV, Secretary-Treasurer Al W3TI. Holmesburg Amateur Radio Club, President Bob Josuweit WA3PZO, Vice President Mike Wurgley N3LXN, Secretary Dave Hogan KB3AKK, Treasurer Sid Kalos W3KZA. After a long period of inactivity Delaware County is rushing ahead under the ARES/RACES Leadership of Dan Amoroso W3DI, they now have a separate room with HF, VHF and UHF capabilities within the 911 facilities. Congratulations to all for an outstanding job one of several through out the Section. Tfc: N3YSI 289, W3IPX 191, N3EFW 186, W3HK 119, N3SW 96, W3IVS 87, K2BCL 72, W3NNL 70, W3UAQ 68, K3TX 64, W3JKX 47, W3TWV 42, KB3BBR 19, KA3KMH 16, N3IRN 9, W3DAB 9, KA3LVP 9, KB3CVO 8, KB3CKD 7, KB3DCT 6, N3KYZ 6, N3HR 5, W3ROQ 5, N3ZXE 5, W3TI 5, AD3X 5, K3ARR 5, N3AS 5, KB3CEZ 2, W3BNR 1. Net Reports: EPA 57, PTTN 31, EPAEPTN 31, PFN 31, D3ARES 9, SEPPTN 8, D4ARES 5, LCARES 4, MCOES 4.

MARYLAND/DC: SM, Bill Howard, WB3V, 410-551-6775 wb3v@arrl.org— MDC Section Web homepage http://users.erols.com/wb3v/mdc. AA OES reports: N3QXW and NU3D. CH EC W3TOM reports 28 members, 4 sessions of the Charles County Amateur Radio Emergency Service Net which meets on 145.39 with liaison to MEPN and 1 drill. The Statewide Winter Exercise occurred on December 12, 2000. Charles County ARES/RACES members involved in this exercise were Bill Palmer/KE3RE, Art Audley/AA3RT and Mike Tackish/KA3GRW. Planning continues for the Southern Maryland SKYWARN sub-net Basics 1 and Winter Storm Skywarn Classes which were scheduled for 27 January in Hughsville, Maryland. On 27 January SKYWARN Basic 1 and Winter Storm classes were held. Classes were held in Hughsville, and instruction provided by Barbara Watson, the NWS SKYWARN Advisor. The classes were well attended by ARES members with 86 attendees from Charles, St Mary's, Calvert, and Prince George's Counties. John Perry, N1EOD, the Amateur SKYWARN Coordinator, arrived in an American Red Cross Command & Communications HumVee. The HumVee was placed on display and attracted quite a bit of attention throughout the day. Press coverage was a new wrinkle for this class session. Pre-event class notices were aired on the Charles County Cable System and additional notices appeared in the Maryland Independent Newspaper. On the day of event, the Maryland Independent Newspaper assigned a news photographer/reporter for the day and then followed up with a reporter. The press coverage of the event resulted in a front page picture in color and a half page story in this major Southern Maryland newspaper. The next series of SKYWARN classes to be held in Southern Maryland are planned for after the National Hurricane Conference (scheduled for April in Washington, DC.) and may include the NWS Hurricane and Storm Assessment Classes. By Bill, WB3V, and with the nets: Net/NM /QND/QTC/QNI: MSN/KC3Y/31/44/343, MEPN/N3WKE/31/75/612, MDD/WJ3K/62/229/720, MDD top brass AA3SB/211 K3JL/178 AA3GV/118 , BTN/AA3LN/31/28/381, Dec MEPN/N3WKE/31/72/583, BTN/AA3LN/25/24/293, Tfc: KK3F 1294, N3QA 250, KJ3E 150, AA3SB 145, N3WKE 117, W3YVQ 93, AA3GV 91, WB4FDT 77, KO4A 74, N3KGM 54, KC3Y 47, W3CB 44, N3DE 43, N3WK 21, N3ZKP 19, K3CSX 18, W3VK 18, W3YD 14, WA1QAA 12, WA3WRT 7, KE3FL 2. PSHR: KK3F 202, W3YVQ 148, AA3SB 145, N3WKE 142, N3ZKP 141, W3VK 137, KO4A 136, W3CB 134, KJ3E 123, WA1QAA 113, AA3GV 113, N3WK 101, KC3Y 86, KE3FL 84, K3CSX 75, DEC WB4FDT 104.

NORTHERN NEW YORK: SM, Thomas A. Dick, KF2GC — http://www.northnet.org/nnyham & http://www.geocities.com/nnyara. e-mail: kf2gc@arrl.org. TLARC - Saranac Lake, NY: Tri-Lakes Amateur Radio Club, W2TLR 1500-2100Z Feb 3, 4, 10, 11. Celebrating the nation's oldest (103rd) winter carnival and ice palace. 7.250, 14.257, 21.312, 28.473. Certificate from Tri-lakes Amateur Radio Amateur Radio Club, PO Box 95, Saranac Lake, NY 12983. The NNYARA - Lake Placid Hamfest Committee met at the Red Cross Building in Saranac Lake, NY, on January 20, 2001 at 11 AM-2:00 PM. First, I want to thank all those in attendance at this very important follow up meeting.. NNY-Clubs represented were SLVRA, NCARC, DOERS, OARC, OVARC, TLARC, CVARC, MVARC, PSARC, and NNYCC. The meeting discussed local area camp grounds, alternate area activities-venues, getting special rates on overnight lodging, banner construction, concessions - food, security & manning the gate, section wide mailings, forums - emergency services, flyer preparations, ticket sales, publicity, test sessions both (amateur and commercial testing) as interest dictates and a special event station. Lake Placid-Hamfest 2001 is now ARRL sanctioned. Check NNYARA Website for updates.

SOUTHERN NEW JERSEY: SM, Jean Priestley, KA2YKN (@K2AA), e-mail ka2ykn@voicenet.com— ASM: W2BE, K2WB, W2OB, N2OO, N2YAJ. SEC: KC2GID. STM: K2UL. ACC: KB2ADL. SGL: W2CAM. OOC: K2PSC. TC: W2EKB. TS: W2PAU, WB2MNF, AA2BN, KD4HZW, WB3IJB, WA2NBL, N2QNX, N2XFM. The restoration of the Battleship New Jersey has begun. A good size crew of truly dedicated hams have turned in to busy bees. But it isn't just hams working. All types of work being done and needs help. The list of volunteers is long and has room. Also, Homeport Alliance is set up to accept monetary donations. The first goal is a BB62 special event station for Memorial Day. Web sites are www.qsl.net/bb62/ Also www.ussnj.org/ and www.bb62museum.org/ Net QNI rpts: NJPN 227 W2CC NJSN 211 K2PB NJM 138 WA2OPY NJN/E 226 AG2R NJN/L 175 AG2R (joint with NNJ) JSARS QNI 367 KC2ATQ SJVN 287 WB2UVB SJTN 75 KB2RTZ. SAR Rpts WA2CUW 123, AA2SV 104, K2UL 94, KB2RTZ 81, K2UI-4 32, WB2UVB 30, KB2VYZ 27, W2AZ 17, KC2CLL 11, N2VQA 11, WA2NDA 8, KA2CQX 7, KB2YJD 2, N2WFN 2, N2ZMI, KB2VSR, KB2YBM, KC2ETU 1. PSHR: KB2RTZ 198, WB2UVB 172, K2UL 172, KA2CQX 140, AA2SV 125, N2WFN 61, N2VQA 35, KA2YKN 19, N2HQL 13, KB2YJD 12 SJTN Mon-Wed-Fri at 8 PM on 147.15, SJVN Every night at 10:30 PM on 147.345.

WESTERN NEW YORK: SM, Scott Bauer, W2LC— The Sheldon Elementary School in Varysburg, NY, had a successful contact with the International Space Station, call sign NA1SS. Congratulations to Karen Washburn the teacher, Fred, WA2CAM, Chris Syracuse a consultant, Scott, AB2IH, Nick, N2VBM, Joe, K2LMH, Ed, W2GUT, and Dave, WB2YCS, for making it all happen. Well done! 10 students asked the astronauts on the ISS questions during the 9 minute long contact. What a thrill it must have been for those students! Check out the web site at http://eag.buffnet.net/iss.html. Wow, cool things do happen in WNY! Get it? The Syracuse Museum of Science and Technology (The MOST) had around 15 Amateurs attend the volunteer training session. They will show case the MOST Amateur Radio station to the public. Congratulations to John, KC2GJM, for BPL in December; and to Joan, KC2ELD, becoming an HF Awards Manager for the Chautauqua County Amateur FM Assoc. Welcome to new ARRL WNY appointees: Emergency Coordinator Andy, KB2EOQ, Chautauqua County; Public Information Officer John KC2FNG; and Official Emergency Station Chris, N3DXJ. Hamfests: June 1,2,3 Rochester Hamfest, ARRL Atlantic Division Convention, at Monroe County Fairgrounds, Route 15A and Calkins Rd; June 16 Cortland Hamfest, Skyline ARC, at Cortland County Fairgrounds. Silent keys: Fred K2FR of RDXA, 73 and good DX Fred. January Net Summaries:

Net	*NM*	*Sess*	*QNI*	*QSP*	*Net*	*NM*	*Sess*	*QNI*	*QSP*
BRVSN	N2OYQ	31	473	00	CHN	W2EAG	31	169	27
CNYTN	WA2PUU	31	292	78	EBN	WB2IJZ	23	450	0
ESS	W2WSS	31	375	113	NYPHONE	N2LTC	31	289	349
NYPON	N2YJZ	31	433	129	NYS/E	WB2QIX	31	393	204
NYS/L	W2YGW	31	300	218	NYS/M	KA2GJV	31	202	57
NYSCN	W2MTA	4	18	4	OARC	N2KPR	5	41	6
OCTEN	E KA2ZNZ	31	1581	221	OCTEN/L	KA2ZNZ	21	626	190
STAR	N2NCB	29	241	22	STTHN	KC2AWA	9	55	2
TIGARDS	W2MTA	4	24	4	WDN/E	N2JRS	31	578	77
WDN/L	W2GUT	31	490	73	WDN/M	KB2VVD	31	533	55

Traffic (Jan 2001), * indicates PSHR, #indicates BPL: N2LTC#* 1262, KA2ZNZ#* 569, W2MTA* 373, WB2IJH* 328, KA2GJV* 324, NN2H* 241, WI2G* 163, W2FR* 161, WB2QIX* 157, N2CCN* 144, NY2V* 90, KC2EOT* 85, KG2D* 81, W2LC* 81, KA2DBD* 74, N2KPR* 63, AF2K* 47, KB2VVD* 47, KB2ETO* 42, KA2BCE* 32, W2PII* 31, N2WDS* 29, WA2GUP* 27, K2DN* 17, WA2UKX* 16, W2RH 15, KC2GVL* 11, KB2WII* 8. Digital; Stn Rx/Tx: K2DN 0/1, KA2GJV 37/6, N2LTC 342/306, NY2V 0/5. Dec 2000 KC2GJM made BPL!

WESTERN PENNSYLVANIA: SM, John Rodgers, N3MSE. ASM: N3MYZ. SEC: N3SRJ. ASM-ARES: WB3KGT. ASM-Packet: KE3ED. OOC: W3ZPI. PIC: W3CG. STM: N3WAV. TC:WR4W. DEC-SO: KD3OH. DEC-N1: N3QCR. DEC-N2: KA3UVC. DEC-S1: KA3HUK. DEC-S2: N3BZW. DEC-Rapid Response: N3HJY. DEC-OES: K3TB. I would like to announce the appointment of Sally Cripe, N3MYZ, as the new assistant section manager for Western Pennsylvania. Sally is a member of the Ellwood City Amateur Radio Club and will serve as my chief assistant in all areas. I am looking forward to working with her especially in getting new ideas on promoting more involvement in the various areas. Sally will also be helping with the planning of the President's Conference and EC Conference that should be this spring. She also plans to be present at the league table at various hamfests so feel free to stop by and say hello. Mike Lazaroff, the DXCC field card checker for the section, has offered to speak at club meetings on how to obtain your DXCC and on QSL'ing. He is also available for field checking at hamfests. Mike, K3AIR, has worked over 200 countries and has a great deal of experience in this area. Any club wishing to contact Mike can do so at k3air@arrl.net.The featured web site for this month belongs to the Radio Association of Erie. The web site address is http://public.surfree.com/n3ntj/rae.html. Please check out their newsletter and other portions of the site. Clubs in need of speakers for meetings may contact me for scheduling. I still have some dates available in my schedule for the year. 73 de John Rodgers, N3MSE, WPA-SM, n3mse@arrl.org.

CENTRAL DIVISION

ILLINOIS: SM, Bruce Boston, KD9UL—SEC: W9QBH. ACC: N9KP. STM: K9CNP. PIC: N9EWA. TC: N9RF. OOC: KB9FBI. DEC-Central: N9FNP. DEC-S/W KB9AIL. The Egyptian RC has created a fund to help young hams get into the hobby. This fund will provide youngsters with a one-time grant to pay their test fee at an ERC-sponsored exam session. The club will give up to 10 grants this year. The new fund was created because the club felt some youngsters might not be able to afford the higher fee. The ERC has given NE9R a plaque in appreciation of his 30 years as the club's training officer. At a meeting of the Metro AC it was reported that four students from the ham class passed their license exam. The ages of students ranged from 12 to 83. All members present joined in thanking W9MNF and W9FO for doing a great job teaching the class. The club continues to operate a slow speed code net every Wednesday (except the first Wednesday) at 7 PM near 7.138 MHz. The NCS is K9PL. The Fulton Co ARC provided assistance to the Woman's Club for the Santa Parade. It was a successful event despite the cold and rain. The Kankakee ARS sponsored APRS digipeater is now on the air. The wide area coverage will be a useful adjunct to emergency communications from north of Chicago to south of Kankakee, including traffic for the NWS. The club has also been working on an archive CD of articles, pictures and other club-related material. DEC N9FNP reports a new repeater is going up in Shelby County. They hope to get more weather reports from stations south and east of the NWS office in Lincoln. The DEC reports 25 ARES members assisted ESDA with the programming of 250 weather radios. The radios will be distributed to day care centers and public buildings. The Starved Rock RC met in January to discuss plans regarding changes to their packet system. They also noted their regular repeater was back in operation, and at last report they were having some glitches with the voter system. Kane Co EC WB9PPK helped distribute weather radios to the residents of Willow Lakes Estates. The Kishwaukee ARC has named W9QGU, K9OVZ, W9GD and KA9EIT life members for the long service and dedication to the club. The group has a new Web site at www.w9icu.com. The Sangamon Valley RC has discussed forming a new ham class for the spring. The club also voted to donate $500 to the ARRL Education Fund. The new SVRC officers are Pres KB9RQZ, VP KD4DLL, Sec KB0YDD, Trea KB9UWY. January traffic: W9HLX 66, WB9TVD 36, N9DT 34, W9FIF 11. ISN Report from WB9TVD QNI-243, QTC-89, Sessions-32. 9RN report de KF4UBX: Sessions 62, traffic handled 167, average per session: 2.69, rate of traffic 3.86. Illinois represented 88% by NN9M W9HLX N9PLM KF9GM. W9VEY Memorial Net report de K9AXS was not available.

INDIANA: SM, Peggy Coulter, W9JUJ—ASM for Resources & Recruitment, W9IH. SEC: K9ZBM. ASEC: WA9ZCE. STM: W9FU. OOC: KC9V. SGL: K9JZZ. PIC: KB9LEI. TC: W9MWY. BM: KA9QWC. ACC: N9RG. Sympathy extended to the families and friends of Silent Keys: 12/28/00, Robert C. Gharis, W9ZYR, Logansport; 12/31/00, Harold A. Seltenright, N9DMC, Butler; 1/10/01, William M. McClintock, W9MZ, Orleans; 1/25/01, William S. Moore, W9WM, Ligonier and 2/5/01, Woodrow Booher, KJ9G, New Castle. They will be missed. Congratulations to Jim McDonald, KB9LEI, IN PIC has been appointed to the PR Committee of ARRL. Thanks to all the ECs who have sent their Annual reports to our SEC, also those sending their 2000 SET reports in. Congrats to Jim, K9ZBM, SEC for successfully completing the ARRL Emergency Communications Course (EC-001) via the internet. Congratulations to Jack Reynolds, AA9BO, who has completed his USA Counties Award for contacting all 3076 counties in the 50 States. How long did it take you Jack? Has any one else done this? The Ft Wayne Radio Club for the 3rd time visited the IN State Developmental Center in Ft Wayne in December. The purpose was to create the illusion that "Santa" has connected to the Mentally Handicapped ranging in age from 16 to 60 via television from the North Pole. This was

Continued on page 120

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$150 COUPON with purchase of IC-706MKIIG*

$180 COUPON with purchase of AH4 and IC-706MKIIG*

$200 COUPON with purchase of AT180 and IC-706MKIIG*

IC-706MKIIG

Proven Performance

- 160-10M/6M/2M/70CM
- All mode w/DSP
- HF/6M @ 100W, 2M @ 50W 440 MHz @ 20W
- CTCSS encode/decode w/tone scan
- Auto repeater • 107 alphnumeric memories

IC-756PRO All Mode Transceiver

- 160-6M @ 100W
- 32 bit DSP
- 5 inch color TFT w/spectrum scope
- Digital IF filter with 41 passband widths
- 121 microphone equalized audio settings
- Multiple DSP controlled AGC loops
- Advanced CW functions
- 101 alphnumeric memories

•Free World Time Clock from ICOM while supplies last.

IC-746 All Mode 160M-2M

$200 COUPON

- 10-2M @ 100W
- IF-DSP+ twin pass band tuning (PBT)
- CTCSS encode/decode w/tone scan
- 102 alphnumeric memories

• FREE Log book w/purchase while supplies last

IC-2100H 2M Mobile Transceiver

- Cool dual display
- 50 watts
- CTCSS encode/decode w/tone scan
- Backlit remote control mic
- Mil spec 810, C/D/E*1
- Auto repeater
- 113 alphnumeric memories

IC-207H Dual Band Mobile

- 45W VHF (2M), 35W UHF (70CM)
- AM aircraft RX
- 182 memories
- CTCSS encode/decode w/ tone scan
- Remote head capable
- Auto repeater

FULL COLOR LCD DISPLAY

Computer Programable, Win 95,98®*

$50 COUPON

IC-2800H Dual Band Mobile

Mounting Kit Included

- 2M/70CM
- Dual band scopes
- 3" color TFT disp
- NTSC video input
- CTCSS encode/decode w/tone scan
- Selectable RF attenuator
- 232 alphnumeric memories
- Auto repeater

IC-718 HF Transceiver

$100 COUPON

- 160-10M @ 100W
- 12V Operation
- Simple to Use
- CW Keyer Built-in
- One Touch Band Switching
- Direct frequency input
- VOX Built-in
- 101 alphnumeric memories

IC-T7H 6W, Dual Band Transceiver

Dual Bands at a Single Band Price!

- 2M/70CM
- 70 alphnumeric memories
- 6W output
- CTCSS encode/decode w/tone scan
- Auto repeater
- Easy operation!
- Mil spec 810, C/D/E*1

IC-T2H 6W, 2M Transceiver

Commercial Grade Rugged

- 6W output
- 40 alphnumeric memories
- Customizable keys
- Auto repeater
- PC Programmable
- CTCSS encode/decode w/tone scan
- Mil spec 810, C/D/E*1

IC-W32A Dual Band Transceiver

- 2M/70CM
- 5W @ 13.5 V
- 200 alphnumeric memories
- CTCSS encode/decode w/tone scan
- True dual band with V/V, U/U
- Auto repeater
- Mil spec 810, C/D/E*1

$20 COUPON

IC-T81A 4 Band Transceiver

Worlds First 4-bander HT

- 6M, 2M, & 70CM @ 5W
- 1.2 GHz @ 1W
- AM, FM, WFM
- 124 alphnumeric memories
- CTCSS encode/decode w/tone scan
- RIT and VXO for 1200 MHz
- Auto repeater

IC-Q7A Dual Band Transceiver

- 2M/70CM
- Wide band receiver - 30 to 1300 MHz**
- 200 alphnumeric memories
- Auto repeater
- Includes AA Ni-Cad's & charger
- CTCSS encode/decode w/tone scan
- Mil spec 810, C/D/E*1

ICOM®

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FT-840
- 100W • 12V DC • DDS
- Gen. Cov. Rx, 100 mem.
- Optional Ext. Auto • Tuners Available

Call Now For Our Low Pricing!

FT-1000MP HF Transceiver
- Enhanced Digital Signal Processing
- Dual RX
- Collins SSB filter built-in
- 100W, Power supply built-in

Call Now For Low Pricing!

expires 3/31/01

FT-100 HF/6M/2M/70CM Transceiver
- Compact Transceiver w/detachable front panel
- Rx 100kHz to 970mHz (cell blocked)
- Tx 100W 160-6M, 50w 2M, 20W 70CM
- Built-in DSP, Vox, CW keyer
- 300 Memories

Call Now For Low Pricing!

FT-817 HF/VHF/UHF TCVR
- 5W @13.8V ext DC • USB, LSB, CW, AM, FM
- Packet (1200/9600 Baud FM)
- 200 mems, built in CTCSS/DCS
- TX 160-10M, 6M, 2M, 440
- Compact 5.3" x 1.5" x 6.5", 2.6 lbs
- 9.6v Nicad or 8 AA battery capable

NEW!

Call Now For Introductory Pricing!

FT-2600M 2M Mobile
- Compact 2M 60W mobile • 12000/9600 baud
- 4 selectable power levels • Built-in CTCSS/DCS
- 175 mems, 8 character alpha-numeric display
- Low intermod Rx, Rugged

Call Now For Low Pricing!

VR-500
Handheld Receiver
- 100kHz - 1300 mHz
- CW, LSB, USB, AM, FM (narrow and wide)
- Cell blocked in USA
- 1000 memory channels
- 8 character alpha-num display

NEW!

Great Sound, Call Today!

VX-5R
50/2M/440HT
- Wideband RX • 6M-2M-440TX
- 5W output • Li-Ion Battery
- 220 mems, opt. barometer unit
- Alpha Numeric Display
- CTCSS/DCS built-in

Call For Low Price!

FT-50RD
2M/440mHz Compact HT
- DVR, Decode, Paging Built-in
- Alpha numeric display
- Wide Band receive
- Battery Saver • 112 Memories
- Mil-Spec • HiSpeed scanning

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FT-847
Ultimate Base Station, HF, VHF, UHF
- 100w HF/6M, 50w 2M/430 mHz
- DSP • Full Duplex Cross-band
- 1200/9600 Baud Packet Ready

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FT-90R
2M/440 Mini Dualbander Transceiver
- 50w 2m, 40w 440mHz
- Wide Rx • Detachable Front Panel
- Packet Ready 1200/9600 Baud
- Built-in CTCSS/DCS Encoder/Decoder
- Less than 4" wide!

Call for Your Low Price!

FT-920 HF+6M Transceiver
- 100w 160-6M, 12VDC
- Built-in DVR, CW Memory Keyer
- DSP, Auto-Notch • 99 Memories
- Computer controllable, CAT System

Call For Low Pricing!

FT-8100R 2M/440 Mobile
- Ultra Compact • 50w/35w 2m/440
- 110 memories • Wide Band RX
- Backlit mic • Remotable front panel w/opt. YSK-8100

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DJ-196T 2M HT

- 5 Watt out
- 40 memories
- Alphanumeric Display
- CTCSS + DCS Built-in
- "S" Meter
- Auto Dialer

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CALL NOW FOR LOW PRICE!

DJ-V5TDC 2M/440 HT

- 5 Watt out w/optional EBP 46
- Cool Clear Design
- 200 Memories • Dry cell pack incl.
- Rx 76 mHz to 1gHz (cell blocked)
- AM Air Rx • Wide FM Rx

Lowest Price Full Feature Dual Band!

$179.95

DR-605TQ 2M/440 Dual Band Mobile

- 50W 2M, 35W 440
- Built-in Duplexer
- 9600 Baud ready
- 50 Memory chanels
- RX Range 136-174mHz/420-470mHz
- CTCSS built in

Call For Low Pricing!

DM-330MVT

- Super Compact
- Lightweight Power Supply
- 30 amp, 5-15 VDC output
- Convenient front panel converters

NEW!

Low HRO Discount Price!

DR-135TP 2M Mobile

- 50 Watt out • Alpha Numeric Display
- 100 mems • Built-in TNC 1200 & 9600 Baud
- Front Panel GPS in • Rear DB-9 Port
- CTCSS/DCS Encode/Decode built in

NEW!

DX-70TH HF Transceiver

- 100W 160-10 Mtrs • 100W 6M, Gencov. Rx
- Full QSK, 100 Mems. • Compact, Remotable
- Dual VFO, 12VDC • 6.2 lbs.

Now In Stock! New Low Price!

COMET

SMA-501 Dual Band

Dual band "Miracle Baby" style antenna, with a male SMA connector. Shown on the popular FT-50R by Yaesu. The antenna is only 1.75 inches tall, and exhibits surprising performance.

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UHV-6

40M-70cm Mobile Antenna

40/*20/15/10/6/2M/70cm
* optional coil

A 6M/2M/70cm whip that accepts 1,2 or 3 HF coils for up to 6 band operation. Simply screw on any combination of HF coils you choose.

Standard PL-259 connector allows easy mounting. Convenient fold-over hinge for entering garages, parking structures, etc...

HF/VHF/UHF on a single antenna!! Contact any Ham Radio Outlet store for duplexer/ triplexer options.

Call for Low Pricing!

NEW!

High Sunspots = Great HF Mobiling!

MSG Series

2M/70cm Mobile Antennas with spring-loaded whip to absorb impacts. Fold-over hinge included as well.

MSG-1000C
Length: 39 inches
Max Pwr: 150W
Conn: PL-259

MSG-1100C
Length: 43 inches
Max Pwr: 150w
Conn: PL-259

NEW!

MH-510

6/2M/70cm HT Antenna w/SMA Connector

The first aftermarket gain antenna for the YAESU VX-5 and the ICOM T8A.

A dramatic improvement over the stock antenna, 20.75 inches of TRIBAND performance.

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DAIWA

CN-410 3.5-150MHz 150W
CN-460M 140-450MHz 150W
CN-465M 140-450MHz 75W

- Compact, Mobile Meter
- Cross Needle Design
- Mounting Bracket Included

CN-101 1.8-150MHz 1.5KW
CN-103 140-525MHz 200W

- Economy Lighted Bench Meter
- Large Cross Needle Display
- Accurate DAIWA Engineering

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KAM '98

- Single port VHF or HF
- RTTY, CW, Packet, GTOR, AMTOR, WEFAX
- GPS, NMEA-0183 compatible
- 6-16 VDC, DB-9 connector port

Call Now For Your Low Price!

GPS Tracker

- GARMIN X12 GPS Built in, Active GPS antenna, KPC-3 Plus ALL in Single package!

NEW!

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KPC-3 Plus/KPC-9612 Plus

High-performance, low power TNC.
Great for packet, and APRS compatible.

Call For Special Low Price!

Detailed illuminated map shows time, time zone, sun position and day of the week at a glance for any place in the world.Continuously moving - areas of day and night change as you watch.• Mounts easily on wall. Size: 34 1/2" x 22 1/2".

Reg $1295. SALE $999.95

CSS

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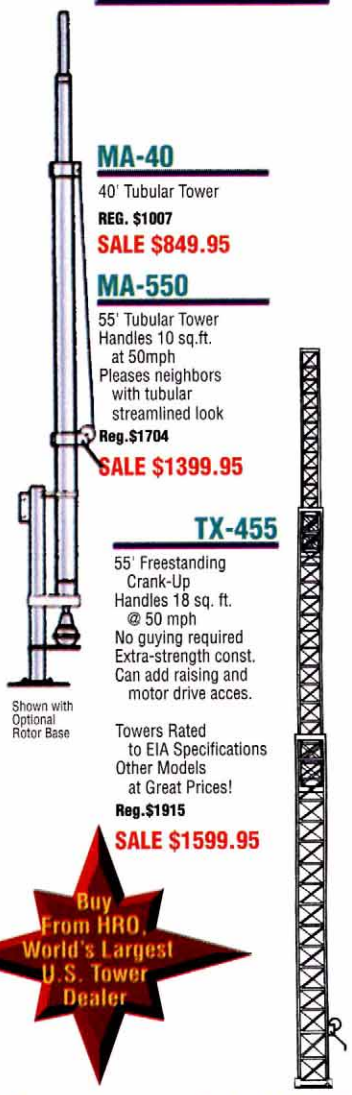
Logwindows The first and best logging program for Windows, Log Windows has been a favorite for nearly a decade. It will be the last logging software you'll ever need. Supports remote antenna switching with TopTen band decoder, TNC control, rotor control, DXCC 2000, DXCC, WPX, WAC, WAS, VUCC, WAS, IOTA Grayline display, Telnet Cluster and more.

Wefax '99 Wefax for your Kantronics KPC or KAM TNCs. Receive real time HF Weatherfax images to keep track of hurricanes, typhoons and other weather events worldwide. If you're a weather fan, you'll enjoy taking advantage of this on option on your Kantronics TNC. Plus, being able to save the images to Windows bitmap files, do automatic scheduling and more.

Digital Trio Get Pacterm '98, Log Windows and Wefax '99 all in one package for a special price. Great for the ham that requires the best. The Digital Trio lets you do all the popular HF modes, and logs your contacts at the same time. Supports PSK-31.

US TOWER



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40' Tubular Tower

REG. $1007

SALE $849.95

MA-550

55' Tubular Tower
Handles 10 sq.ft. at 50mph
Pleases neighbors with tubular streamlined look

Reg.$1704

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MODEL NO.	HEIGHT MAX.	HEIGHT MIN.	NUMBER SECTIONS	WEIGHT POUNDS	SEC. OD Top.	SEC. OD Bot.
MA-40	40'	21'6"	2	242	3"sq.	4 1/2"
MA-550	55'	22'1"	3	435	3"sq.	6"
MA-550MDP*	55'	22'1"	3	620	3"sq.	6"
MA-770	71'	22'10"	4	645	3"sq.	8"
MA-770MDP*	71'	22'10"	4	830	3"sq.	8"
MA-850MDP*	85'	23'6"	5	1128	3"sq.	10"

Standard bases and eve mounts included with all towers (except MA-770, 770-MDP and 850-MDP)
•MDP models complete with heavy-duty motor drive with positive pull down, MCL-100 required.

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FREE STANDING CRANK-UP TOWERS

Will handle 18 sq. ft. antennas at 50 MPH winds.

MODEL NO.	HEIGHT MAX.	HEIGHT MIN.	NUMBER SECTIONS	WEIGHT POUNDS	SEC. OD Top.	SEC. OD Bot.
TX-438	38'	21'6"	2	355	12 1/2"	15"
TX-455	55'	22'	3	670	12 1/2"	18"
TX-472	72'	22'8"	4	1040	12 1/2"	21 5/8"
TX-472MDP*	72'	22'8"	4	1210	12 1/2"	21 5/8"
TX-489	89'	23'4"	5	1590	12 1/2"	25 5/8"
TX-489MDPL*	89'	23'4"	5	1800	12 1/2"	25 5/8"

* TX-472MDP includes heavy duty motor drive with positive pull down, MCL-100 required.
TX-489MDPL comes with heavy duty motor drive with dual level wind and positive pull down.
MDPL models include fully operational limit switch packages.

FREE STANDING HEAVY-DUTY CRANK-UP TOWERS

Will handle 30 sq. ft. antennas at 50 MPH winds.

MODEL NO.	HEIGHT MAX.	HEIGHT MIN.	NUMBER SECTIONS	WEIGHT POUNDS	SEC. OD Top.	SEC. OD Bot.
HDX-538	38'	21'6"	2	600	15"	18"
HDX-555	55'	22'	3	870	15"	21 5/8"
HDX-572	72'	22'8"	4	1420	15"	25 5/8"
HDX-572MDPL*	72'	22'8"	4	1600	15"	25 5/8"
HDX-589MDPL*	89'	23'8"	5	2440	15"	30 5/8"
HDX-689MDPL*	89'	23'8"	5	3450	18"	37 1/8"
HDX-5106MDPL*	106'	24'8"	6	3700	15"	37 1/8"

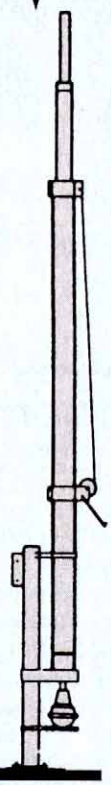
* Includes heavy-duty motor drives with dual level wind and positive pull down. MDPL models include fully operational limit switch packages.
*HDX-689MDPL rated at 60 sq. ft. of antenna at 50 mph winds. * HDX-5106MDPL rated at 35 sq. ft. of antenna at 50 mph winds.

FREE STANDING "LOW PROFILE" COMPACT CRANK-UP TOWERS

Will handle 18 sq. ft. antennas at 50 MPH winds. (TMM-433HD handles 24 sq. ft.)

MODEL NO.	HEIGHT MAX.	HEIGHT MIN.	NUMBER SECTIONS	WEIGHT POUNDS	SEC. OD Top.	SEC. OD Bot.
TMM-433SS*	33'	11'4"	4	315	10"	18"
TMM-433HD*	33'	11'4"	4	400	12 1/2"	20 7/8"
TMM-541SS*	41'	12'	5	430	10"	20 7/8"

* Rotators must be top mounted



Shown w/optional rotor base and rotator.

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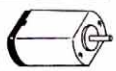
Miniature DC Motor



Mabuchi # FF-N20PN
Miniature 1.5 to 3 Volt DC motor. Ideal for modelsand radio control applications where small size is important. No load rating: 15,800 RPM @ 2.4 V, 96 mA. Length (excluding shaft), 0.654" long x 0.47" x 0.39". 0.039"(1mm) dia. x 0.13" long shaft. Solder-loop terminals. Large quantity available.

CAT# DCM-166
2 for $1.50
150 for 60¢ ea.
600 for 50¢ ea.
1500 pieces 35¢ ea.

Solar Panel

Output: approx. 3 Volts @ 40 mA. 2.40" square x 0.13" thick epoxy-encapsulated silicon photovoltaic panel removed from solar lighting system. Solid, almost -unbreakable module with easy-to-solder spots on backside. Ideal for solar-powered battery chargers and other projects.

CAT # SPL-60 **$3.50 each**

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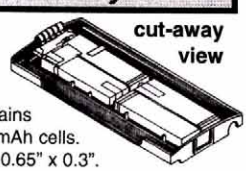

cut-away view

Philips # 25733. New, recharge-able pack manufactured for cell phones. Contains four 1.2 Volt, 850 mAh cells. Each cell is 1.8" x 0.65" x 0.3". With little effort you can remove the cells from the enclosed battery pack and reconfigure them to suit your needs.

CAT# NMH-53 **$2.00 each** 10 for $17.50

Halogen Display Lamp

MR16, bi-pin base halogen lamp. 12 Volt, 50 Watt flood lamp with front glass cover. 1.97" dia. x 1.46" deep. 0.2" (5mm) pin spacing.

CAT # HLP-50 10 for $37.50 **$4.50 each**

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done using the Amateur Television Repeater W9TE. The North Pole location was actually at the QTH of N9NRO. There were live cameras at the Center so Santa N9TZ could view the audience of well over 50 and Santa spoke to each of them. The whole concept of this project was the work of Cliff N9MKB. There were many Hams who helped make this happen with many happy people. NM'sITN/W9ZY, QIN/K9PUI/KJ9J, ICN/K8LEN, VHF/W9FU.

Net	Freq	Time/Daily/UTC	QNI	QTC	QTR	Sess
ITN	3910	1330/2130/2300	3073	566	1518	93
QIN	3656	1430/0000	207	59	770	56
ICN	3705	2315	83	17	303	26
Hoosier VHF nets(12 nets)			1375	49	1302	82

D9RN total QTC 167 in 62 sessions IN represented by WB9QPA, W9UEM, k9QBR, KB9NPU, N9KNJ and W9FU. 9RN total QTC 178 in 62 sessions IN represented by KO9D, K9PUI, N9HZ, WB9OFG, WB9UYU and W9FC. Tfc: W9FC 232, K9PUI 102, W9ZY 90, WB9QPA 72, KO9D 58, W9JUJ 51, W9UEM 50, W9FU 47, N9KNJ 40, KA9QWC 34, KA9EIV 31, K9GBR 30, W9BRW 24, KB9NPU 22, K9RPZ 18, K8LEN 17, WB9OFG 14, WA9JWL 9, W9EHY 7, AB9AA 7, AB9A 6, K9DIY 5, K9ZBM 4, W9NCE 3, K9CUN 2, K9OUP 1.

WISCONSIN: SM, Don Michalski, W9IXG— With deep regret, I wish to inform you that Robert R. Tlachac, WB9DFZ, recently passed away. Also, Jerry Fadness, W9GF, age 71. Jerry was a member of RRRC. Our congratulations to Ernie Swanson, K9LO, for receiving the prestigious ARRL A-1 Operator award! W9NN, Bob Baird, has received his ARRL certificate for being an amateur for 80 years! Bob has helped form the QCWA and is a charter member. "Green Bay Professional Packet Radio" (GBPPR) is experimenting with new hi-tech digital communications. Check their projects out at http://www.gbppr.org. We need more hams willing to experiment with new frontiers in communications! 9RN report for January has Wisconsin with 98% representation. The National Weather Service spring 2001 severe weather spotter (two hour) class schedule is now posted at http://www.crh.noaa.gov/mkx/2001-spotter.htm. I strongly recommend that those interested in reporting storm information attend one of these *free* classes! Reservations *not* required!! You can contact Rusty Kapela at rusty.kapela@noaa.gov or your local county Emergency Management Director for questions. Our STM, K9LGU, is giving presentations to clubs on traffic handling procedures. If interested, contact Denny, K9LGU, at k9lgu@arrl.net or let me know. Several Hams in the section have enrolled in the 2nd ARRL Emergency Communicator course. Listen for future openings on the RACES net Sundays at 8 A.M. on 3993.5 MHz. 73, Don, W9IXG, (608)274-1886. Tfc: K9JPS 715, W9IHW 657, WZ7V 653, W9YPY 641, N9VE 542, WD9GNK 494, K9GU 483, N9TVT 451, K9FHI 120, W9CBE 117, K9LGU 109, N9BDL 89, N9CK 75, N9KHD 70, AG9G 62, KG9B 56, KE9VU 52, KB9ROB 50, W9UW 47, AA9BB 38, AD9X 37, W9BHL 36, W9YCV 36, W9RCW 34, WB9ICH 32, K9HDF 30, KA9FVX 30, WD9FLJ 28, W9ODV 10, W9PVD 10, WPVD 6, K9UTQ 6.

DAKOTA DIVISION

MINNESOTA: SM, SM, Randy Wendel, KM0D—A reminder to those who often overlook your ARRL club affiliation...be sure you have updated and completed your annual club report. You can also do this online at ARRL's Web site. In early Feb, I assisted with John Beargrease Sled Dog marathon communications. I, along with SEC Gary, N0ZOD, and wife Gladys, KB0TUT, ARES Southern DEC Russ, N0QK, Olmsted ARES EC Steve, KB0PSS, Randy KC0CJN and Mike, KC0GNF, all took a few vacation days to see the great outdoors along the north shore. The "full story" about the experience was sent out via ARRL MN Section eSignals e-mail newsletter. In early February, an arrest was made of an individual who had admitted to malicious interference on public service channels in the Twin Cities. This had been occurring sporadically over a couple year period. The suspect had been crossbanding between city channels which caused confusion as well as reporting "officer down" among other deliberate transmissions. It is an embarrassment to know that this person is a license radio amateur. Certainly, you and I know, as does any average person, that there is always a bad apple in the barrel. Unfortunately, there are also people who will view a ham radio person as one of those "bad people" because of the media reports that this suspect is a ham radio operator. It is our activities as licensed radio operators which cause the general public to view us as they do from what they see and hear. Unfortunately, most of the public does not see much of the positive contributions made by radio amateurs. I hope all of us can, in one small way or another, find ways to help give amateur radio the respect and positive "PR" it deserves. A little public service can go a long way...a marathon here, delivering a traffic message there, standing on a parade route or shadowing a first aid station and even giving a presentation at a local school. We all hold a brush...let's paint a picture that we AND the general public can be proud of. 73 de Randy Wendel.

NORTH DAKOTA: SM, Kent Olson, KA0LDG — I just wanted to touch base with everyone and introduce myself as the new ARRL Section Manager of North Dakota. I'm replacing Bill Kurtti who did a great job for the last fourteen years. I hope I can measure up. I fly for the Happy Hooligans at the NDANG, and have been involved with ham radio for 20 years now. Since I am new to this position, I am trying to see if there is anything in particular that you would like to see happen differently. I could certainly use any input. I will be trying to attend functions around the state throughout the year, so please feel free to let me know when anything special is coming up in your club. Also, please e-mail me with addresses and email addresses so I can be as current as possible. I'm also looking for anyone who is interested in being part of the ND Field Organization leadership. Some appointment positions are open, and need to be filled. Tfc: N0RDJ 1. HF NM KE0XT reports Goose River Net, 8:30 AM Sunday 5/87/0; WX Net 8:30 AM Mon to Sat 48/938/12; Data Net 6:30 PM daily 31/831/15.

SOUTH DAKOTA: SM, R.L. Cory, W0YMB— Word is that Senate Bill 207 did not make it out of committee which is good news for Amateur Radio. This bill was to stop mobile cell phone and 2-way radio operation. Another South Dakota Silent Key in January was Delton Gerber, KA0HMI, of the Sisseton area. Watertown Lark sponsored nets ended year

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"As I got older, my high frequency hearing loss was destroying my ham radio for me . . ."

-- Martin F. Jue, K5FLU
President and Founder
MFJ Enterprises, Inc.

I know I'm not the only ham who can't understand all the speech in a QSO caused by high frequency hearing loss. I developed a solution that I want to share with my fellow hams.

I almost gave up my ham radio hobby

I have been a passionate ham radio operator for over 40 years ever since I was a teenager. I loved every minute of it. Still do, but I almost had to give it up.

As I grew older (I'm 56 now) I found myself asking "*What did you say?*" so often it got downright embarrassing. I can hear pretty good most of the time. I just can't always understand what people are saying and my left ear is weaker than my right ear.

It got to where I was having trouble carrying on QSOs. I could hear, but I just couldn't quite make out all the words.

My hearing problem almost put a stop to my lifelong hobby.

There was no way I was going to give up ham radio . . .

Research showed me what to do

I searched the literature and spoke to hearing and speech experts.

According to their research on the intelligibility of speech in hearing English words:

1. The frequencies important for speech intelligibility are the consonant sounds from 500 to 4000 Hz. They contribute 83% of word intelligibility.

Frequencies from 500 to 1000 Hz contributes 35% of word intelligibility and 35% of sound energy.

Frequencies from 1000 to 4000 Hz contributes *48% of intelligibility* but has *only 4% of sound energy!*

2. In contrast, frequencies from 125 to 500 Hz contributes 55% of sound energy but only 4% to word intelligibility.

***In** other words, nearly half the speech intelligibility is contained in 1000 to 4000 Hz frequency range with only 4% of the speech sound energy.*

On the other hand, the low frequencies 125 to 500 Hz have most of the speech energy but contribute very little to intelligibility.

How I improved my ability to hear and understand QSOs

The research showed me what to do.

First, drastically increase the speech energy above 500 Hz where 83% of intelligibility is concentrated.

Second, drastically reduce the speech energy below 500 Hz that contributes only 4% of intelligibility.

Amateur radio communications limit audio to about 300 to 2700 Hz.

I split the audio band into four overlapping octave ranges centered at 300, 600, 1200, 2400 Hz.

I could boost or cut each range by nearly 20 db to give me full control. This let me maximize speech intelligibility for most kinds of frequency loss.

My left ear is weaker than my right ear so I split the output audio into left and right channels with separate 2½ watt amplifiers. A balance control lets me equalize the perceived loudness to each ear. *Now both ears help in improving speech intelligibility!*

I couldn't believe my ears!

I built one and hooked it to my rig.

I boosted the high frequencies, cut the low frequencies, set the volume and adjusted the balanced control so I could hear each side equally loud.

I couldn't believe my ears! Speech that I could hear but barely understand before was now highly understandable. I got my ham radio back!

With this concept, you'll *understand* QSOs better and enjoy ragchewing and contesting more, even if you don't have high frequency hearing loss.

It helped me so much I wanted to share this with my fellow hams

I developed this into an accessory that any ham can use.

I made it immune to RFI, added a front panel phone jack, on/off speaker switch, two selectable transceiver inputs, a bypass switch for in/out comparison and built it into 10Wx2½Hx6D inch aluminum enclosure. Needs 12 VDC.

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Replace your rig's audio section for superb audio. Eliminate hum, buzzes, poor frequency response, low audio power.

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2000 with participation increases. The Novice net averages 8 and the N.F. South Dakota 2-meter reported 12.1 average as reported by John, N0MEA. Quarter Century Wireless Association, Dakota Chapter 102 now has 37 members. Their special event station W0DAK was on the air Feb 10-11 to celebrate their 24th anniversary. Reports on this will appear here next month. For more information on QCWA, contact NY0F or K0ERM. The hamfest at Marina Inn at South Sioux City, NE, will be held on June 15-16, 2001.

DELTA DIVISION

ARKANSAS: SM, Bob Ideker, WB5VUH —Roger & I have completed our transition. Tnx for his assistance & what he has done during his terms. We will continue to grow in areas he & his leadership have developed. It is my pleasure to be returning as SM. I've really missed being involved and hope to visit with you and your club asking for your help regarding several important issues. I ask for your suggestions, understanding & guidance again. Your involvement & efforts are needed now to help decide how we are going to get more hams re-involved. Your personal persuasion can be priceless when it comes to our success. My "Back to the Basics" theme is an important feature factor for our success. We're going to have lots of fun & achieve many goals together. Pse return to club meetings and offer your help. Call others & invite them to attend; not just once, but over and over. For this to be a teamwork effort, everyone must be engaged in supporting our activities. Help continue our successes by staying active. YOU are the key to our success. Let your good ideas work to our advantage. Let's visit at April hamfests in Ft. Smith and LR. Also, hope you made hamfests in Russellville & Harrison. Others to be announced later. Tfc. for Jan include 62 sessions for 1140 minutes with QTC of 566 & QTR of 1140.. What a great job our HF nets and NMs and NCSs have done to keep the interest high. AR represented by 98% by KC5TMU, K7QZR, W5LZQ, K5BOC, W9YCE, AB5AU, WB5BRD, AD5AM, & N5HZC.

LOUISIANA: SM, Mickey Cox, K5MC — ACC: KM5YL. OOC: WB5CXJ. PIC: K5IQ. SEC: AC5TM. STM: KG5GE. LCW NM: W4DLZ. LTN NM: WB5ZED. KB5RQK has been given dual EC appointments for Adams County (Natchez, MS) and Concordia Parish by W5XX (MS SM) and yours truly, respectively. David lives in Vidalia and his appointments will help both sections provide more effective emergency/public service communications. Hats off to KD5IBY for being among the first in the nation to complete all three levels of the new on-line emergency communications course offered by ARRL. New officers for the Thibodaux ARC are N5THI, President; WA5LIS, Vice-President; KB5UOO, Secretary; KC5PBN, Treasurer; KD5KWQ and KA5YGB, Activity Managers; and WA5PRI, W5YL Officer. DXers need to observe the new fees for the outgoing ARRL QSL Bureau (still a great bargain), along with the increased costs for international mail and IRCs. Although it appears that the peak of the sunspot cycle has now passed, there's still plenty of DX to work. Now's the time to renew your ARRL membership before the new rates go into effect July 1. Younger members should seriously consider a life membership. I became a life member 25 years ago, which is about the smartest thing I've ever done! Tfc: WB5ZED 911 (BPL), W5CDX 148, K5IQZ 143, K5MC 60, KG5GE 29, K5DPG 27, KM5YL 21. PSHR: WB5ZED 198, K5IQZ 128, W5CDX 126, K5DPG 122, K5MC 107, KG5GE 93, W5PY 82, KM5YL 75. Net Reports: sessions/QNI/QTC. LTN: 31/364/102. LCW: 31/197/42.

MISSISSIPPI: SM, Malcolm Keown, W5XX—Over a thousand hams enjoyed another very successful ARRL Section Convention and Capital City Hamfest. Highlighting the agenda were Riley Hollingsworth, K4ZDH, who inundated attendees on FCC enforcement activities, and Brennan Price, N4QX, from ARRL Headquarters, who explained Official Observer functions and the Amateur Auxiliary's role in assisting the FCC. In addition, in the other duties as assigned category, Brennan checked hundreds of DXCC cards. On the PR side, AB5WF, managed to get three consecutive nights of local TV coverage on the Hamfest and SKYWARN. Thanks to all the Jackson ARC crew, who worked so hard to make the Hamfest a success. Special thanks go to AB5WF, Chairman, KC5ZJE, KC5ESL, KC5FAD, W5LEW, KM5WN, W5KWB, KA5SBK, KB5KKI, KM5GE, W5GEJ, KC5OSM, and W5PFR. Congratulations to Martin, K5JLU, on the very fine write up in the business section of the Jackson Clarion-Ledger regarding his innovative ham radio ventures. Regret to report the passing of W5YAR in Greenville and KK5ME in Jackson. PIO. Net Reports: sessions/QNI/QTC: MSPN 31/3906/57, MTN 31/141/66, MSN 31/1236/11, PBRA 31/732/3, Jackson Co ARES/RACES 31/379/8, MSSN 23/107/2, WCMS ARES 14/181/0, Lowndes Co ARES 5/43/0, MCARA 5/55/0, JARCEN 5/104/0, LARCEN 5/94/0, Stone Co ARES 4/43/0, MBHN 4/32/0, MLEN 4/86/1, Attala Co ARES 4/29/3, HAEN 4/88/0. PSHR: KB5W 142, W5XX 106, KJ5YY 73. Tfc: KB5W 282, KJ5YY 12, W5XX 7.

TENNESSEE: SM, O. D. Keaton, WA4GLS—ACC: WA4GLS. ASM: WB4DYJ. PIC: KE4CES. SEC: WD4JJ. STM: WA4HKU. TC: KB4LJV. Thanks to those SRARC members who participated in the parade. You did a great job. 2001 officers of the club are KF4VLU-pres, K4KNO-vp, KF4GNV-treas, WB4OFM-sec. Good news from the Bandspread of NARC. There will be a hamfest on June 16 in the old manufacturers outlet mall must off Music Valley Drive in Nashville. Plan to be there. RACK members turned out again. Thanks to those who participated in the communications during the Wallace Memorial Church's Christmas program and the Knoxville Track Club's No Frills, Chills 10K race: WI8X, KG4AKE, AF1P, KG4CFB, N4LFR, WB4CXC, KB8LVU, N4OQK, N4EWK, N4KNX, K4PCK, WM4U, KC4TRY, KB4G & KB4FZK. Congratulations to the following individuals who have been elected 2001 officers for CARC: Joe, WA4MKA-pres. Tom, K4CMY-vp, Dennis KF4VBD-sec, Jack, AD4LP-treas. Barbara, WA4RMC- hamfest chairperson and Charles, AD4F-editor of WAVES. ORARC elects new officials, David, K4PZT-pres, Chet, W4GEK- vp Chuck, KF4VZO-sec, Gwen, KF4ROX-treas, Carl, WA4ADG-tech dir, George, KD4BDT-mem dir, Walt, W0BUH-pub dir. Meet with the MARC bunch at Shoney's in Columbia every 2nd Thurs at 7 PM. DARC officers are: Tom, K4TTA-pres, Terry, KB4KA-vp, Ben, KU4AW-sec., Whit Crowley, treas, Freddy, KF4ZGJ-dir pub, Gary Blinkmann- dir por, Arlene, AA5GX- dir met, Bill, WA4MJM - rep trustee. BSFARC members who took part in

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Reads complex impedance . . . Super easy-to-use

New MFJ-259B reads antenna SWR . . . Complex RF Impedance: Resistance(R) and Reactance(X) or Magnitude(Z) and Phase(degrees) . . . Coax cable loss(dB) . . . Coax cable length and Distance to fault . . . Return Loss . . . Reflection Coefficient . . . Inductance . . . Capacitance . . . Battery Voltage. LCD digital readout . . . covers 1.8-170 MHz . . . built-in frequency counter . . . side-by-side meters . . . Ni-Cad charger circuit . . . battery saver . . . low battery warning . . . smooth reduction drive tuning . . . and much more!

The world's most popular SWR analyzer just got incredibly better and gives you more value than ever!

MFJ-259B gives you a complete picture of your antenna's performance. You can read antenna SWR and Complex Impedance from 1.8 to 170 MHz.

You can read Complex Impedance as series resistance and reactance (R+jX) or as magnitude (Z) and phase (degrees).

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You can read SWR, return loss and reflection coefficient at any frequency simultaneously at a single glance.

You can also read inductance in uH and capacitance in pF at RF frequencies.

Large easy-to-read two line LCD screen and side-by-side meters clearly display your information.

It has built-in frequency counter, Ni-Cad charger circuit, battery saver, low battery warning and smooth reduction drive tuning.

Super easy to use! Just set the bandswitch and tune the dial -- just like your transceiver. SWR and Complex Impedance are displayed instantly!

Here's what you can do

Find your antenna's true resonant frequency. Trim dipoles and verticals.

Adjust your Yagi, quad, loop and other antennas, change antenna spacing and height and watch SWR, resistance and reactance change instantly. You'll know exactly what to do by simply watching the display.

Perfectly tune critical HF mobile antennas in seconds for super DX -- without subjecting your transceiver to high SWR.

Measure your antenna's 2:1 SWR bandwidth on one band, or analyze multiband performance over the entire spectrum 1.8-170 MHz!

Check SWR outside the ham bands without violating FCC rules.

Take the guesswork out of building and adjusting matching networks and baluns.

Accurately measure distance to a short or open in a failed coax. Measure length of a roll of coax, coax loss, velocity factor and impedance.

Measure inductance and capacitance. Troubleshoot and measure resonant frequency and approximate Q of traps, stubs, transmission lines, RF chokes, tuned circuits and baluns.

Adjust your antenna tuner for a perfect 1:1 match without creating QRM.

And this is only the beginning! The MFJ-259B is a complete ham radio test station including -- frequency counter, RF signal generator, *SWR Analyzer*™, RF Resistance and Reactance Analyzer, Coax Analyzer, Capacitance and Inductance Meter and much more!

NEW

Call your favorite dealer for your best price!

MFJ-259B **$259.95**

Call or write for Free Manual

MFJ's comprehensive instruction manual is packed with useful applications -- all explained in simple language you can understand.

Take it anywhere

Fully portable, take it anywhere -- remote sites, up towers, on DX-peditions. It uses 10 AA or Ni-Cad batteries (not included) or 110 VAC with MFJ-1315, $14.95. Its rugged all metal cabinet is a compact 4x2x6¾ inches.

How good is the MFJ-259B?

MFJ *SWR Analyzers*™ work so good, many antenna manufacturers use them in their lab and on the production line -- saving thousands of dollars in instrumentation costs! Used worldwide by professionals everywhere.

More MFJ SWR Analyzers™

MFJ-249B, $229.95. Like MFJ-259B, but reads SWR, true impedance magnitude and frequency only on LCD. No meters.

MFJ-209, $139.95. Like MFJ-249B but reads SWR only on meter and has no LCD or frequency counter.

MFJ-219B, $99.95. UHF *SWR Analyzer*™ covers 420-450 MHz. Jack for external frequency counter. 7½x2½x2¼ inches. Use two 9 volt batteries or 110 VAC with MFJ-1312B, $12.95. *Free* "N" to SO-239 adapter.

SWR Analyzer Accessories

Dip Meter Adapter

MFJ-66, $19.95. Plug a dip meter coupling coil into your MFJ *SWR Analyzer*™ and turn it into a sensitive and accurate bandswitched dip meter. Save time and take the guesswork out of winding coils and determining resonant frequency of tuned circuits and Q of coils. Set of two coils cover 1.8-170 MHz depending on your *SWR Analyzer*™.

Genuine MFJ Carrying Case

MFJ-29C, $24.95. Tote your MFJ-259B anywhere with this *genuine* MFJ custom carrying case. Has back pocket with security cover for carrying dip coils, adaptors and accessories.

Made of special foam-filled fabric, the MFJ-29C cushions blows, deflects scrapes, and protects knobs, meters and displays from harm.

Wear it around your waist, over your shoulder, or clip it onto the tower while you work -- the fully-adjustable webbed-fabric carrying strap has snap hooks on both ends.

Has clear protective window for frequency display and cutouts for knobs and connectors so you can use your MFJ *SWR Analyzer*™ without taking it out of your case. *Look for the MFJ logo for genuine authenticity!*

MFJ-99, $54.85. Accessory Package for MFJ-259/B/249/B/209. Includes *genuine* MFJ-29C carrying case, MFJ-66 dip meter adapter, MFJ-1315 110 VAC adapter. ***Save $5!***

New! ***Tunable Measurement Filter™***

MFJ-731, $89.95. *Exclusive* MFJ tunable RF filter allows accurate SWR and impedance measurements 1.8 to 30 MHz in presence of strong RF fields. Has virtually no effect on measurements. Works with all SWR Analyzers.

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MFJ-224 **$159.95**

MFJ 2 Meter *FM SignalAnalyzer*™

Measure signal strength over 60 dB range, check and set FM deviation, measure antenna gain, beamwidth, front-to-back ratio, sidelobes, feedline loss in dB. Plot field strength patterns, position antennas, measure preamp gain, detect feedline faults, track down hidden transmitters, tune transmitters and filters. Plug in scope to analyze modulation wave forms, measure audio distortion, noise and instantaneous peak deviation. Covers 143.5 to 148.5 MHz. Headphone jack, battery check function. Uses 9V battery. 4x2½x6¾ in.

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the ARRL 10 M contest: Paul, W4NPL, Julian, W5EDQ, Junior, WA4WMN & Avery, KE4RKJ. DRN 5 rpt: 62 sess, 566 msg, TN rep 60% by KE4GYR, W4RIX, KF4OOI & W4OGG. Net sess/QTC/QNI: TMPN 31/34/2419; TCWN 25/29/217; TEMPN 23/48/874; TEPN 26/48/3115. TSCWN 28/16/174. Tfc: KE4GYR 45, N4PU 41, WA4HKU 41, W4SYE 14, WA4GLS 8, WB4DYJ 6, WA4GZZ 2.

GREAT LAKES DIVISION

KENTUCKY: SM, Bill Uschan, K4MIS—ASM: Tom Lykins, K4LID. SEC. Ron Dodson, KA4MAP. SGL. Bill Burger, WB4KY. STM: Mitchell Sparks, KG4EAB. ACC. Todd Schrader, KF4WFZ. TC: Scotty Thompson, KI4AT. BM: Ernie Schrader, KC4IVG. PIC: Steve McCallum, W2ZBY. This might be my last Section News, and I want to take the opportunity to thank all those that have supported me the past four years. Also a special thanks the Section Cabinet for making Amateur Radio grow in Kentucky. Spring is already here and all severe weather spotter training classes should be winding up. Remember March 31, 2001, Hamfest in Elizabethtown and it should be a good one. It is with deep regret that we mention that Paul Offut, W4LWD, of Louisville, and Jim Kunnecke, K4YGE, of Calvert City became SKs during January. Lexington has anew LGL, that being, Ronald Nutter, KA4KYI. To keep up on local ordinances and PRB-1 concerns, feel free to contact Mr. Nutter.

Net	*QNI*	*QTC*	*Sess*	*Manager*
KRN	547	23	23	N4AFB
KTN	1377	32	31	K4LID
KTN	1408	31	31	KB4VKS
KYCWNET	361	41	31	K4AVX
TSTMN	437	42	30	KG4EAB
CARN	421	29	29	AD4EI
4ARES	497	35	31	WA4RRR

Tfc: K4AVX 38, WB4ZDU 5. PSHR: N4CQR 78. KE4JFS 115.

MICHIGAN: SM, Dick Mondro, W8FQT (w8fqt@arrl.org)—ASM: Roger Edwards, WB8WJV (wb8wjv@arrl.net). ASM: John Freeman, N8ZE (n8ze@arrl.net). SEC: Deborah Kirkbride, KA8YKK (ka8ykk@arrl.net). STM: James Wades, WB8SIW (wb8siw@arrl.net). ACC: Sandra Mondro, KG8HM (kg8hm@arrl.net). OOC: Donald Sefcik, N8NJE (n8nje@arrl.net). PIC/SNE: David Colangelo, KB8RJI (dcolangelo@ameritech.net). SGL: Ed Hude, WA8QJE (edhude@juno.com). TC: Dave Smith (DSmith@smithassoc.com). Youth Activities: Steve Lendzion, KC8MCQ (kc8mcq@arrl.net). BM: Thomas Durfee, Jr., WI8W (wi8w@arrl.net). Congratulation to the new officers of the Fenton Area Amateur Radio Assn President Richard Fowler K8MEG, VP Harvey Clement K8RVN, Secretary Terry Hyvonen N8CFO, Treasurer Helene Fowler WA8MEG and Activities Director Norma Glock KB8SSN. With a membership dues increase going into effect July 1, 2001, the ARRL is offering a special five-year membership plan until then, so members can lock in at the current, lower dues rates. Effective immediately, current or new members in the US can obtain a five-year renewal or membership for $146 ($122 for those 65 or older)—a saving of $24 ($18 for those 65 or older) from the cost of year-to-year renewal at current rates! The special five-year membership offer expires June 30, 2001, the last day the present dues schedule is in effect. After that, annual dues will increase to $39 for individuals ($34 for those 65 and older). How can we sell Amateur Radio to served agencies? We live in a cellphone society. A wireless world where nearly everything we need to know is in the palm of our hand. So imagine waking up one day to find your cellphone useless, your wired phone inoperable — and all the centralized infrastructure that helps you and your "Palm", pager and cellphone have a close encounter, gone. The public needs to be reminded that the same devices that make our lives simpler and unite us all in an instant rely on very complex networks which in turn rely on uninterrupted power and unthreatened computing or switching centers. A tornado, severe storm, power outage or surge can take it all down in the blink of an eye. Ham radio on the other hand — that ages-old wonder that goes anywhere— is self-contained and runs on just about any kind of emergency power or batteries and is nearly ALWAYS there to save the day. Emergency Management Officials have found ham radio absolutely indispensable when absolutely nothing else worked. The power crisis in California is waking people up to the reality that our gadgets and gizmos are not invincible. I can't think of a better "sales pitch" for Amateur Radio. Tfc (Jan): K8GA 223; KB8ZYY 168; K8LJG 122; WX8Y 118; KA9EIZ 108; W8RTN 95; AA8PI 81; K8AE 79; WB8SIW 78; AA8SN 58; W8RF 44; W8RNQ 41; WI8K 38; K3UWO 35; K8UPE 31; K8ZJU 20; N8EXV 20; WA8DHB 16; KC8NHV 9; N8TDE 8; N8UN 7; KI8GR 5; N8EXS 3. Deadline 5th of the month Please. Please support the following Section Nets:

Net	*QNI*	*QTC*	*Sess*	*Net Mngr.*	*Freq.*	*Time*	*Day*
QMN	583	189	62	WB8SIW	3.663	6:30&10 PM	Daily
MACS	250	33	31	W8RNQ	3.953	11 AM	Daily (1 PM Sun.)
MITN	223	217	30	N8FPN	3.952	7 PM	Daily
UPN	1070	36	34	AA8SN	3.921	5 PM	Daily (Noon Sun.)
GLETN	620	81	31	WB8ICN	3.932	8:30 PM	Daily
SEMTN	303	50	31	WI8K	146.640	10:15 PM	Daily
WSSBN	798	38	31	K8CPW	3.935	7 PM	Daily
D8 ARES	24	0	04	VE3EUI	3.932	7:30 PM	Friday
MI-ARPSC	84	4	4	W8FQT	3.932	5 PM	Sunday

OHIO: SM, Joe Phillips, K8QOE, Fairfield, (to contact me, see page 12)... Many *QST* issues there is a complete listing of the Ohio Section Cabinet in this spot complete with e-mail addresses. These are 12 Section officers who serve the ARRL membership in various roles but many readers may not know what each one does specifically. First, there are five assistant section managers (ASMs) for each of the five geographic divisions of Ohio. These ASMs - NW Ohio - Ron Griffin, N8AEH, Findlay (n8aeh@arrl.net), SW - John Haungs, W8STX, Cincinnati (w8stx@arrl.net), NE - Bob Winston, W2THU, Cleveland (w2thu@nacs.com); SE - Connie Hamilton, N8IO, Marietta (n8io@arrl.net) and Central - Mary Carpenter, N8OAM (n8oam@arrl.net) - all represent the SM and seek out news to promote hams in their individual areas. All are available for speaking to ham radio club meetings and Hamfest forums. Then, the ARES emergency programs in

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MFJ-989C *Legal Limit* Antenna Tuner

MFJ uses super heavy duty components to make the world's finest legal limit tuner

MFJ uses super heavy duty components -- roller inductor, variable capacitors, antenna switch and balun -- to build the world's most popular high power antenna tuner.

The rugged world famous MFJ-989C handles 3 KW PEP SSB amplifier input power (1500 Watts PEP SSB output power). Covers 1.8 to 30 MHz, including MARS and WARC bands.

MFJ's *AirCore*™ roller inductor, new *gear-driven* turns counter and weighted spinner knob gives you exact inductance control for absolute minimum SWR.

You can match dipoles, verticals, inverted vees, random wires, beams, mobile whips, shortwave -- nearly any antenna. Use coax, random wire or balanced lines.

MFJ-989C
$359.95

You get everything you've ever wanted in a high power, full featured antenna tuner -- widest matching range, lighted Cross-Needle SWR/Wattmeter, massive transmitting variable capacitors, ceramic antenna switch, built-in dummy load, *TrueCurrent*™ Balun, *scratch-proof* Lexan front panel -- all in a sleek compact cabinet (10¾Wx4½Hx15D in).

MFJ AirCore™ Roller Inductor gives high-Q, low loss, high efficiency and high power handling.

MFJ's exclusive *Self-Resonance Killer*™ keeps damaging self-resonances away from your operating frequency.

Large, self-cleaning wiping contact gives good low-resistance connection. Solid 1/4 inch brass shaft, self-align bearings give smooth non-binding rotation.

MFJ *No Matter What*™ Warranty

MFJ will repair or replace your MFJ-989C (at our option) *no matter what* for one year.

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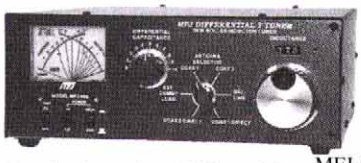
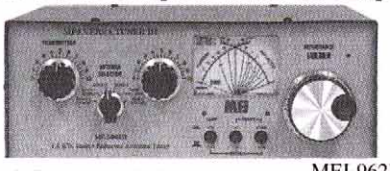
MFJ-986 Two knob *Differential-T*™



MFJ-986
$329.95

Two knob tuning (differential capacitor and *AirCore*™ roller inductor) makes tuning foolproof and easier than ever. Gives minimum SWR at only one setting. Handles 3 KW PEP SSB amplifier input power (1.5 KW output). Gear-driven turns counter, lighted peak/average Cross-Needle SWR/Wattmeter, antenna switch, balun. 1.8 to 30 MHz. 10¾Wx4½Hx15 in.

MFJ-962D *compact* Tuner for Amps



MFJ-962D
$269.95

A few more dollars steps you up to a KW tuner for an amp later. Handles 1.5 KW PEP SSB amplifier input power (800W output). Ideal for Ameritron's AL-811H! *AirCore*™ roller inductor, gear-driven turns counter, pk/avg lighted Cross-Needle SWR/Wattmeter, antenna switch, balun, Lexan front, 1.8-30MHz. 10¾x4½x10⅞ in.

MFJ-969 300W *Roller Inductor* Tuner

MFJ-969
$199.95

Superb *AirCore*™ Roller Inductor tuning. Covers *6 Meters* thru 160 Meters! 300 Watts PEP SSB. *Active* true peak reading lighted Cross-Needle SWR Wattmeter, *QRM-Free PreTune*™, antenna switch, dummy load, 4:1 balun, Lexan front panel. 3½Hx10½Wx9½D inches.

MFJ-949E *deluxe* 300 Watt Tuner

MFJ-949E
$149.95

More hams use MFJ-949s than any other antenna tuner in the world! Handles 300 Watts. Full 1.8 to 30 MHz coverage, 48 position *Precision48*™ inductor, 1000 Volt tuning capacitors, *full size* peak/average lighted Cross-Needle SWR/Wattmeter, 8 position antenna switch, dummy load, *QRM-Free PreTune*™, scratch proof Lexan front panel. 3½Hx10⅝Wx7D inches. **MFJ-948, $129.95.** Economy version of MFJ-949E, less dummy load, Lexan front panel.

MFJ-941E *super value* Tuner

MFJ-941E
$129.95

The most for your money! Handles 300 Watts PEP, covers 1.8-30 MHz, *lighted* Cross-Needle SWR/Wattmeter, 8 position antenna switch, 4:1 balun, 1000 volt capacitors, Lexan front panel. Sleek 10½Wx2½Hx7D in.

MFJ-945E HF+6 Meter *mobile* Tuner

MFJ-945E
$119.95

Extends your mobile antenna bandwidth so you don't have to stop, go outside and adjust your antenna. Tiny 8x2x6 in. *Lighted* Cross-Needle SWR/Wattmeter. Lamp and bypass switches. Covers 1.8-30 MHz *and* 6 Meters. 300 Watts PEP. **MFJ-20, $4.95,** mobile mount.

MFJ-971 *portable/QRP* Tuner

MFJ-971
$99.95

Tunes coax, balanced lines, random wire 1.8-30 MHz. Cross-Needle Meter. SWR, 30/300 or 6 Watt QRP ranges. Matches popular MFJ transceivers. Tiny 6x6½x2½ inches.

MFJ-901B *smallest* Versa Tuner

MFJ-901B
$79.95

MFJ's smallest (5x2x6 in.) and most affordable wide range 200 Watt PEP Versa tuner. Covers 1.8 to 30 MHz. Great for matching solid state rigs to linear amps.

MFJ-16010 *random* wire Tuner

MFJ-16010
$49.95

Operate all bands anywhere with MFJ's reversible L-network. Turns random wire into powerful transmitting antenna. 1.8-30 MHz. 200 Watts PEP. Tiny 2x3x4 in.

MFJ-906/903 *6 Meter* Tuners

MFJ-906
$79.95

MFJ-906 has lighted Cross-Needle SWR/wattmeter, bypass switch. Handles 100 W FM, 200W SSB. **MFJ-903, $49.95**, Like MFJ-906, less SWR/Wattmeter, bypass switch.

MFJ-921/924 *VHF/UHF* Tuners

MFJ-921 or MFJ-924
$69.95

MFJ-921 covers 2 Meters/220 MHz. **MFJ-924** covers 440 MHz. SWR/Wattmeter. 8x2½x3 inches. Simple 2-knob tuning for mobile or base.

MFJ-922 *144/440 MHz* Tuner

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Ultra tiny 4x2½x1¼ inch tuner covers VHF 136-175 MHz and UHF 420-460 MHz. SWR/Wattmeter reads 60/150 Watts.

MFJ-931 *artificial* RF Ground

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$89.95

Creates artificial RF ground. Also electrically places a far away RF ground directly at your rig by tuning out reactance of connecting wire. Eliminates RF hot spots, RF feedback, TVI/RFI, weak signals caused by poor RF grounding. **MFJ-934, $169.95**, Artificial ground/300 Watt Tuner/Cross-Needle SWR/Wattmeter.

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Ohio are all under the leadership of Section Emergency Coordinator (SEC) Larry Rain, WD8IHP, Mansfield (wd8ihp @arrl.net). Each of Ohio's 88 counties have an EC under his guidance. Next Amateur Auxiliary is under the authority of Official Observer Coordinator, Richard Kuns, KC8TW, Fairfield (kc8tw@arrl.net). These Official Observer volunteers monitor our frequencies (both lo-bands and repeaters) for unsafe or illegal acts. The Section Traffic Manager, Jack Wagoner, WB8FSV, Hillard (fsv@netwalk.com) organizes Ohio's fine traffic nets. State Government Liaison Jeff Ferriell, K8ZDA, (jferriell@law.capital.edu) work with local LGLs in reviewing all local governments handling of ham radio matters and he keeps an eye on the Ohio government (governor, legislature, judicial) in Columbus. Most of their work centers on antenna laws, of course. Special Service Clubs and Affiliated Clubs of the ARRL in Ohio are under the guidance of Affiliated Clubs Coordinator Brenda Krukowski, KB8IUP, Toledo (kb8iup@arrl.net). Public relations and Ohio ham radio newsletters are the responsibility of Public Information Coordinator Scott Yonally, N8SY, Mansfield (n8sy@arrl.net). Special technical advisors, a service to non-hams, are under the guidance of Technical Coordinator Mike Brown, W8DJY, Middletown (w8djy@arrl.net). Beside the basic responsibilities, three cabinet members perform special tasks. Ron Griffin edits the Ohio Section Journal, Scott Yonally is contest manager for the Ohio Section Newsletter contest - in its 10th year - and Jeff Ferriell runs communications for the Great Ohio Bicycle Adventure (GOBA) de K8QOE. Now for the January traffic reports

Net	QNI	QTC	QTR	Sess	Time	Freq	NM
BN (E)	170	41	249	31	1845	3.577	WD8KFN
BN (L)	194	61	283	31	2200	3.577	NY8V
OSN	184	74	687	31	1810	3.708	WB8KQJ
OSSBN	2545	418	2167	93	1030, 1615, 1845	3.9725	N8IO
OH Section ARES					1700 Sn	3.875	WD8IHP

Tfc N8IO 253, N8IXF 181, WD8KFN 179, W8STX 162, N8BV 138, N8TNV 91, WB8KVM 82, KA8FCC 81, KD8HB 70, N8DD 75, WA8SSI 69, KI8IM 66, KC8HJL 56, WB8HHZ 50, W8PBX 47, W8RGS 46, WA8EYQ 45, KA8VWE 41, WD8KBW 40, N8RRB 40, K8PJ 38, N7CEU 36, WB8PMG 31, KC8DWM 29, K8QIP 29, N8YWX 29, K3RC 28, KC8JKE 27, KD9D 25, N8CW 23, KI8O 23, NY8V 23, K8JMP 19, N8OD 19, NS8C 18, N8IRB 18, KC4IYD 17, W8RG 15, N8GOB 15, WB8SIQ 15, AB8ESY 14, K8IG 14, KB8SBK 14, N8GP 13, KC8KQL 13, N8WLE 12, KC8HTP 10, KC8HPR 9, N8IOW 9, K8RDK 9, N8RAK 8, KI8GW 3, KB8TIA 3, K8WC 1. (Dec) K8PJ 38, WB8PMG 26, KB8TIA 5.

HUDSON DIVISION

EASTERN NEW YORK: SM Rob Leiden, KR2L—STM: Pete Cecere, N2YJZ. SEC: Ken Akasofu, KL7JCQ. ACC: Shirley Dahlgren, N2SKP. SGL: Herb Sweet, K2GBH. PIC: John Farina, WA2QCY. BM: Ed Rubin, N2JBA. OOC: Hal Post, AK2E. TC: Rudy Dehn W2JVF. ASM: Tom Raffaelli, WB2NHC. ASM: Bob Chamberlain, N2KBC. ASM: Andrew Schmidt, N2FTR. ASM: Richard Sandell, WK6R. ASM: Phil Bradway, KB2HQ. Net Reports (January 2001) Check-ins (QNI)/Traffic handled (QTC+QSP): AES 58/8 CDN 244/102 CGESN 37/6 ESS 375/234 HVN 617/170 SDN 433/80 NYPHONE 289/700 NYPON 433/265 NYS/E 393/415 NYS/M 202/122 NYS/L 300/456 NYSPTEN 368/86. Spring means public service events are happening! Please volunteer with your local club. It's fun and it gets Amateur Radio in front of the public to help preserve our frequencies! 73 de KR2L. PSHR: N2JBA 144, WB2ZCM 144, N2YJZ 138, KC2DAA 134, W2AKT 123, WA2YBM 115. Tfc: N2JBA 76, N2YJZ 44, KC2DAA 42, N2TWN 41, WB2ZCM 41, WA2YBM 17, N2AWI 15, W2AKT 13, K2A V V 8, W2CJO 7 WA2BSS 5, N2NMF 4, KL7JCQ 1, KC2BUV 1.

NEW YORK CITY / LONG ISLAND: SM, George Tranos, N2GA. ASM: KA2D, N1XL, K2YEW, W2FX, KB2SCS. SGL: N2TX. SEC: KA2D. ACC: N2MUN. PIC-East: N2RBU. PIC-West: K2DO. TC: K2LJH. BM: W2IW. OOC: N1XL. STM: WA2YOW. The NYC/LI Section Convention went on even though a major snow and ice storm blanketed the area. Over 100 hams braved the weather and enjoyed the event, held in conjunction with Ham Radio University 2001. Special thanks to HRU 2001 Chairman - Phil Lewis N2MUN, the Great South Bay Amateur Radio club, W2V Special Event Operator John Nistico, NY6DX, and all the volunteers who helped out. HRU 2002 / NLI Section Convention will be held next year on Sunday, January 20, 2002. The ARRL Hudson Division PRB-1 Committee has again been successful and a NY State PRB-1 bill has been reintroduced as Assembly Bill A-1565. We need your support! Please write a letter or send an e-mail to your Assemblyman asking them to support or cosponsor this bill. More info and sample letters are on both the NLI and Hudson Division Web sites. Field Day is right around the corner - June 23 & 24. Clubs - let me know when and where you are setting up - e-mail me your plans! Congratulations to Diane, K2DO, for being appointed chairman of the ARRL Public Relations Committee! Diane reminds all clubs to update their Web pages with current information about meeting dates, times, location and contact person. Public Service events: LI Marathon is May 6. Classes: LIMARC one day Tech class on Apr. 28 in Levittown. As of this column, Volunteer Exam sessions will no longer be listed in *QST* because of insufficient space. All VE sessions are available on the NLI Website - Check it out at www.arrlhudson.org/nli. Report all changes to N2GA before the 12th of the month. Traffic: WB2GTG 521, N2AKZ 168, KB2KLH 116, W2RJL 111, WA2YOW 36, KA2UEC 33, KA2YDW 15, KC2FWD 14, N2TEE 10.

NORTHERN NEW JERSEY: SM, Jeff Friedman, K3JF— Net and traffic data submitted by STM Dave, WB2FTX.

Net	Sess	QNI	QTC	QSP
NJM	31	138	82	78
NJPN	25	227	26	26
NJSN	31	211	14	14
NJN/E	31	226	760	66
NJN/L	31	175	98	48
CJTN	31	250	51	46
NJVN/E	31	497	45	43
NJVN/L	31	401	41	39

Tfc: N2GJ 111, W2MTO 63, KC2AHS 49, N2OPJ 45, N2RPI

MFJ *Switching* Power Supplies

Power your HF transceiver, 2 meter/440 MHz mobile/base and accessories with these new 25 or 45 Amp MFJ MightyLite™ Switching Power Supplies!

No RF hash . . . Super lightweight . . . Super small . . . Volt/Amp Meters . . .

MFJ's new adjustable voltage switching power supplies do it all! Power your HF or 2M/440 MHz radio and accessories.

MFJ's *MightyLites*™ are so light and small you can carry them in the palm of your hand! Take them with you anywhere.

No more picking up and hauling around heavy, bulky supplies that can give you a painful backache, pulled muscle or hernia.

MFJ's 25 Amp *MightyLite*™ weighs just 3.7 lbs. -- that's *5 times lighter* than an equivalent conventional power supply. MFJ's 45 Amp is even more dramatic -- *8 times lighter* and weighs just 5.5 pounds!

No RF hash!

These babies are clean . . . Your buddies won't hear *any* RF hash on your signal! *None* in your receiver either!

Some competing switching power supplies generate objectionable RF hash in your transmitted and received signal.

These super clean MFJ *MightyLites*™ meet all FCC Class B regulations.

Low Ripple . . . Highly Regulated

Less than 35 mV peak-to-peak ripple under 25 or 45 amp full load. Load regulation is better than 1.5% under full load.

Fully Protected

You won't burn up our power supplies!

No RF Hash!

MFJ-4225MV
25 Amp
$149.95
plus s&h

MFJ-4245MV
45 Amp
$199.95
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No RF Hash!

They are fully protected with Over Voltage and Over Current protection circuits.

Worldwide Versatility

MFJ *MightyLites*™ can be used anywhere in the world! They have switchable AC input voltage and work from 85 to 135 VAC or 170 to 260 VAC. Replaceable fuse.

MightyLites™ . . . Mighty Features

Front-panel control lets you vary output from 9 to 15 Volts DC.

Front-panel has easy access five-way binding posts for heavy duty use and cigarette lighter socket for mobile accessories. MFJ-4245MV has two sets of quick-connects on the rear for accessories.

Brightly illuminated 3 inch meters let you monitor load voltage and current.

A whisper quiet internal fan efficiently cools your power supply for long life.

Two models to choose from . . .

MFJ-4225MV, $149.95. 25 Amps maximum or 22 Amps continuous. Weighs 3.7 pounds. Measures 5¾Wx4½Hx6D in.

MFJ-4245MV, $199.95. 45 Amps maximum or 40 Amps continuous. Weighs 5.5 pounds. Measures 7½Wx4¾Hx9D in.

NEW! 25 Amp MightyLite™

Super light, super compact switching power supply delivers 25 Amps maximum/ 22 Amps continuous at 13.8 Volts DC. Low ripple, highly regulated. ***No RF Hash!*** Five-way binding posts for high current. Quick connects for accessories. Over voltage/current protection. 110 or 220 VAC operation. Meets FCC Class B regs. 3.5 lbs. 5½Wx2½Hx10¾D in.

MFJ-4125
25 Amp
$109.95
plus s&h

MFJ 35/30 Amp Adjustable Regulated DC Power Supply

Massive 19.2 pound transformer . . . No RF hash . . . Adjustable 1 to 14 VDC . . .

MFJ-4035MV
$149.95
plus s&h

MFJ's heavy duty conventional power supply is excellent for powering HF or 2 Meter/440 MHz transceiver/accessories.

A massive 19.2 pound transformer makes this power supply super heavy duty! It delivers 35 amps maximum and 30 amps continuous without even flexing its muscles. Plugs into any 110 VAC wall outlet.

It's highly regulated with load regulation better than 1%. Ripple voltage is less than 30 mV. *No RF hash* -- it's super clean!

Fully protected -- has over voltage protection, fold back short circuit protection and over-temperature protection.

You get front panel adjustable voltage from 1 to 14 VDC with a convenient detent set at 13.8 VDC. A pair of front-panel meters let you monitor voltage and current.

Three sets of output terminals include a pair of heavy duty five-way binding posts for HF/VHF radios, two pairs of quick-connects for accessories and a covered cigarette lighter socket for mobile accessories.

A front-panel fuse holder makes fuse replacement easy. Whisper quiet fan speed increases as load current increases -- keeps components cool. 9½Wx6Hx9¾D inches.

MFJ *High Current* Multiple DC Power Outlets

Power two HF/VHF transceivers and six or more accessories from your 12 VDC power supply

MFJ-1118
$74.95
plus s&h

MFJ-1116
$49.95
plus s&h

MFJ-1112
$34.95
plus s&h

New!
MFJ-1117
$54.95

MFJ-1118, $74.95. This is MFJ's most versatile and highest current *Deluxe Multiple DC Power Outlet*. Lets you power two HF and/or VHF transceivers and six or more accessories from your transceiver's main 12 VDC supply.

Two pairs of super heavy duty 30 amp 5-way binding posts connect your transceivers. Each pair is fused and RF bypassed. Handles 35 Amps total.Six pairs of heavy duty, RF bypassed 5-way binding posts let you power your accessories. They handle 15 Amps total, are protected by a master fuse and have an ON/OFF switch with "ON" LED indicator.

Built-in 0-25 VDC voltmeter. Six feet super heavy duty eight gauge color-coded cable with ring tongue terminals. Binding posts are spaced for standard dual banana plugs. Heavy duty aluminum construction. 12½x2¾x2½ in.

MFJ-1116, $49.95. Similar to MFJ-1118. No 30 amp posts. Has "ON" LED and 0-25 VDC voltmeter. 15 amps total.

MFJ-1112, $34.95. Similar to MFJ-1116. No on/off switch, LED, meter, fuse.

NEW! MFJ-1117, $54.95. For powering four HF /VHF radios (two at 35 Amps each and two at 35 Amps combined) simultaneously. Tiny 8x2x3 inches.

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All are protected by MFJ's famous No Matter What™ one year limited warranty.

40, KB2VRO 40, K2VX 25, K2PB 23, W2CC 23, N3RB 14, KC2ANN 13, K2DBK 9.

MIDWEST DIVISION

IOWA: SM, Jim Lasley, N0JL—ASM: N0LDD. SEC: NA0R. ACC: N0IJP@KE0BX. BM: K0IIR@W0CXX. SGL: K0KD. STM: KB0RUU. Welcome to KB0RUU as the new STM. Richard is involved with traffic handling at the Tenth Region level and now will be helping the section. TSARC in Cresco is having a full day seminar in May. Looks like the main topic are preparedness and the next New Madrid quake. DARC is looking forward to this years hamfests. Sorry to note the loss of K0ZCA this month. You can see real time wx radar at www.crh.noaa.gov/dmx according to N0ZXJ. DMRAA list 75 that helped with Operation Santa Claus this year. Not all were hams. That means there is room to grow! DSM hamfest coming up also. Here is a quote from the EIDXA's editor. "How do we attract youth into our club? DXing and Contesting have very energetic draws for some of us. How do we re-energize our club with some younger members?" This seems to be a continuing problem for all clubs. How is yours trying to attract youth? Quad City ATV club has new officers: KC0AHZ, N9EZC, WD0AMA. CVARC notes that WA3AFS has credit for 339 countries. I probably don't have that many counties! Newsletters were received from TSARCN, DARC, DMRAA, EIDXA, SEITS, CVARC, GRARC. Tfc: W0SS 255, KB0RUU 132, N0JL 33, N6DSC 16, WB0B 8. PSHR: KB0RUU 156, N6DSC 20.

KANSAS: SM, Orlan Cook, W0OYH— ASM/ACC/OCC: Robert Summers, K0BXF. SEC: Joseph Plankinton, WD0DMV. STM: Ron Cowan, KB0DTI. PIC: Scott Slocum, KC0DYA, and TC: Frank Neal, N8FN. A well done toll for the fine Mine Creek Hamfest last weekend. I enjoyed visiting with those of you that were there. I got a very nice letter from Merrill, KF0WL, asking me to thank ARRL and Stan N0ABA, for providing the fine DXCard Checking service at the Valley Center ARC Hamfest. He said, "this program is working well for DXers." ARRL HQ received "a pleasant surprise". Normally membership falls off this time of the year, but it increased. Our division increased by 22 making us 5th. Thanks for the following newsletters: The Jo Co RAC "Feedback",Wheat State Wireless Association", "Douglas Co ARC", & "The Ks Neb RC". Don't forget to put Aug 19 on your 'calendars' for the ARRL Ks State convention and Section Meeting in Salina. Dec. Kansas Nets: sessions/QNI/QTC, KSBN 31/1260/80 KPN 23/342/14 KMWN 31/678/529 KWN 31/1078/718 CSTN 26/2112/ 103 QKS 61/325/96 QKS-SS 11/32/5 SEC 56/549/19. QNS KB0AMY KC0AUH N0BTH K0BXF WD0DDG WD0DVM AA0IQ KC0CFL W0PBV KC0CIG KB0WEQ WA0SSR. TEN 305 msgs 62 sessions Kans 95% w/W0FE AA0FO KX0I K0PY W0WWR WB0ZNY W0SS/Mgr. BBS AA0HJ received 148 W1AW Bulletins 0 Personal 0 NTS. W0WWR 580, W0OYH 72, WB0ZNY 69, K0RY 38, NB0Z 36, KB0ODT 32, KX0I 23, N0ZR 13. OBS-WA0DTH 20, N0ZIZ 8, W0FCL 6.

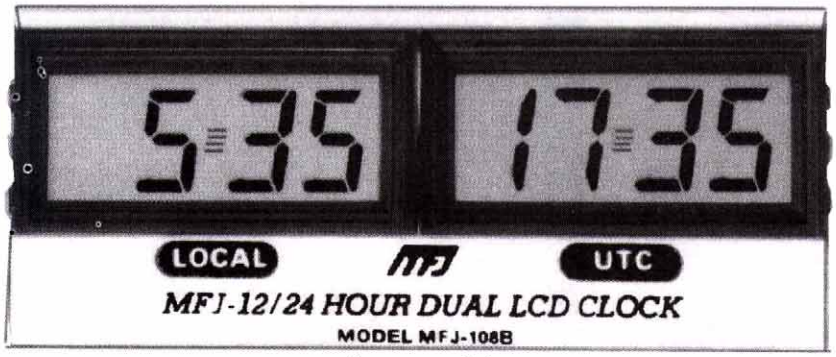
MISSOURI: SM, Dale Bagley, K0KY— For more news, check-out ARRL MO Webpage http://www.qsl.net/arrl-mo. This month MO Section Amateurs can get together at the Lebanon Hamfest on Apr 7, and the Joplin Hamfest on Apr 14, ARRL Section members and others are encouraged to stop by the ARRL Table and attend the MO Section ARRL Forum at the Joplin Hamfest. Phil Urquioia, K0DAT, from Hallsville, MO, has been appointed as the NM for the Sideband version of Missouri Traffic Net. Richard Bleick, KB0ANR, from California, MO, has been appointed as DEC for District F. Gene Bess, KC0IUO, has received the appointment to be EC for Pulaski County. The Section is proud to have these fine individuals assume these positions of leadership. Dale Huffington, AE0S, has accepted the position as Chairman for the CMRA Hamfest/ARRL MO Section Convention. The Convention will be held Aug. 25, at the National Guard Armory just north of Columbia on Hwy 63. At the Feb State Emergency Management Agency Communications Conference, Patrick Boyle, K0JPB, SEC, hosted an ARES Leadership meeting for EC, DEC and several served agencies. Dean Bickford, K0PHI, from Kimberling City, MO and EC volunteered to help organize a Statewide Simulated Emergency Test. Herb Petereit, W0AFY, an EC from Cassville said he would assist Dean on this project. There were 217 individuals attending this years conference and quite a large number of Amateur Radio operators in addition to the ARES leadership. Chuck Miller, WA0KUH, reports that Kansas City Amateur and Race Organizer, Jerry Morrison, W0OCT, was featured on the cover of the Kansas City Star ad section. It always good for amateurs to get some good public relations exposure. Net sess/QNI/QTC: Audrain ARC 4/41/2;MTN 31/557/91; WAARCI 4/76/0; St. Louis 66 QNI; Rollabillboard 31/421/11; SPARKS 4/50/0; Jackson Co ARES 4/52/0; N0ATH Rptr 4/72/0. Tfc: KE0K 100.

NEBRASKA: SM, Bill McCollum, KE0XQ—ASM: W0KVM, N0MT, WY0F, WB0ULH & WB0YWO. It is with deep regret to inform you that Ellen, WB0HWF, became a Silent Key. Ellen was the executive secretary for the AK-SAR-BEN ARC for 17 years. Amateurs from the Omaha area provided communications for the Cornhusker Winter Game on February 3 - 4. Net Reports: ENE ARES: ONI 230, QTC 2 & 31 sessions. NE 40M Net: QNI 546, QTC 14 & 30 sessions. NMPN: QNI 1838, QTC 14 & 31 sessions. Mid NE ARES 2M Net: QNI 378, QTC 7 & 31 sessions. NESN: QNI 1137, QTC 10 & 31 sessions. W0IRZ Memorial Net QNI 690, QTC 3 & 4 sessions. MARES: QNI 181, QTC 3 & 4sessions. Tfc: K0PTK 100, KE0XQ 20, WY0F 10, W0AP 7, KA0O 4, W0EXK 2, W0UJI 2, W0WHY 2.

NEW ENGLAND DIVISION

CONNECTICUT: SM, Betsey Doane, K1EIC— BM: KD1YV. OOC: W1GC. PIC: W1FXQ. SEC: WA1D. SGL: K1AH. STM: K1HEJ. TC: W1FAI. NARL has a new president-Mario, KB1DMT. Congrats Mario and a huge thank you goes to Joe, AA1GW, who did a marvelous job during the past few years! Joe presented to Ted, WA1NXC, NARL's Ham of the Year Award at their meeting a couple of months ago. Ted has been given this award for his invaluable service to the Club. Congratulations Ted! Sincere condolences to Dan, K3UFG, on the loss of his grandson-what a tragedy. Our sympathy, too, to members of SCARA on the loss of their friend and fb ham in CT Bill, K1PVT. It's good to see CPN NM N1DIO back on the air after an unexpected hospital visit. NTS has a new chair of the Eastern Area Staff replacing Bill W2MTA who chaired

MFJ 24/12 Hour Clocks



Shown actual size

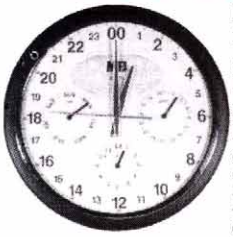
Dual 24/12 hour LCD Clock

MFJ-108B

$19.95 plus s&h

MFJ-108B dual clock has separate 24 hour and 12 hour displays. Lets you read both UTC and local time simultaneously. Features huge high-contrast 5/8 inch LCD numerals that makes it easy to read across the room. Mounted in solid brushed aluminum frame with sloped face for easy viewing. Synchronizable to WWV for split-second timing. Quartz controlled for excellent accuracy. Long life battery included. 4½Wx1D x2H in. MFJ's famous *No Matter What*™ one year limited warranty. *$6 s&h.*

DXer's Wall Clocks



MFJ-125, $29.95. 12 inch DXer's Quartz wall clock gives 24 hour time plus more. Has three smaller independently settable dials for 12 hour time, day of week and date. No more day/date confusion when logging DX! Highly visible, easy-to-read dials! Has Seconds hand.

MFJ-115, $24.95. Set this 24 hour clock to UTC/ GMT and you can determine the time in any time zone of the world at any time of the day. Premier world cities encircle its colorful world map face to indicate time zone. 12 inch face is easy to see across room. Has Seconds hand.

MFJ-105C, $19.95. *World's most popular ham radio wall clock!* True 24 hour Quartz movement. Huge 12 inch black face with large white numerals give excellent visibility across room. Attractive gold colored hour, minute and seconds hands.

MFJ-126, $24.95. 12 hour Quartz movement gives 12 hour time on inner dial (for XYL) and 1200 to 2400 hour time on its outer dial (for you). Attractive clean, white face is highly visible. Real glass cover! Handsome hunter green trim. Has seconds hand.

Hi-Contrast LCD Clocks

MFJ-119B, $49.95. Giant LCD Display 24/12 Hour Clock. Has *giant* see-across-the-shack 2¼ inch time digits. Digital calendar or clock modes. Displays inside temperature (F/C), relative humidity, month, date and day of week. Handsome hunter green and tan color. Wall mount. 8½x9 inches.

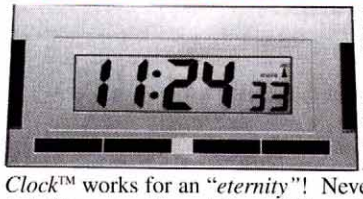
MFJ-118, $24.95. 24/12 hour clock has jumbo 1¼ inch LCD digits. Displays 24 or 12 hour time, year, month, date, and day of week. 100 year full calendar. Hang on wall or desk mount. 5¾Wx2½Hx½D in.

MFJ-107B, $9.95. 24 hour UTC Clock has large 5/8 inch LCD numerals. Synchronizable to WWV. Solid brushed aluminum frame lasts for years. Long life battery included. 2¼x1x2 in.

MFJ-112, $24.95. 24/12 Hour World Map LCD Clock displays time in *every time zone in the world.* Selected time zone flashes on LCD world map. Displays 24 or 12 hours, minutes, seconds, year, month, date, day, time zones, cities. Single button accesses pre-set second time zone. Alarms for two time zones. Adjusts for daylight savings time.

MFJ-152, $24.95. Read Indoor *and* Outdoor temperatures *and* 24/12 Hour time at-a-glance on huge 3/4 inch LCD digits! Choose F or C. Stores minimum and maximum temperature readings. Has backlight for in-the-dark viewing, outdoor temperature sensor with ten foot cable.

Solar Atomic Clock



MFJ-123, $79.95. **MFJ's** *exclusive* solar powered *Eternity Atomic Clock*™ works for an "*eternity*"! Never need batteries! Never need to set time! **Whopping** LCD display is 2 inches tall and 6¾ inch wide -- clearly visible across the room. **Choose** 24 or 12 hour time.

MFJ-116, $14.95. Big bright 5/8 inch LED digits. 24 or 12 hour, 9 min. ID timer, battery back up. Black. 110VAC.
MFJ-116DC, $19.95. 12 VDC, plugs in cigarette lighter. *Great for motorhomes and truckers!* 12 hour only.

Monster Display *Atomic Clock* with PinPointAccuracy™

MFJ-120, $69.95. 24/12 hour *Atomic Clock* automatically receives WWVB for millisecond accuracy. Monster 2 inch LCD characters. Reads relative humidity and temperature (F or C). Has alarm. Attractive metallic copper color. Use on desk or mount on wall. Giant 8x10½Wx¾D inch showpiece.

MFJ-388 **$29.95** **MFJ *CyberEAR*™** **Tiny** powerful MFJ *CyberEar*™ plugs in and loops over ear -- captures and amplifies sounds by 12 dB! Extends your hearing range, helps you hear every word at hamfests and club talks -- even if you're on the back row! Great for eyeball QSOs. 30 day money back if not absolutely delighted. *Not a hearing aid.*

7 Band WeatherAlert

MFJ-8200 **$29.95** plus s&h

Receive continuous weather info/ warnings on all 7 weather channels: 162.4/.425/.45/.475/.5/.525/.55 MHz from 380 U.S. locations 24 hours/day. Also includes AM/FM radio, spotlight, siren, flashing light for emergencies. Water resistant cabinet. Shoulder strap. Great for hamfests, DXpeditions, camping.

14-in-1 *HamTool*™

MFJ-7604 **$19.95** plus s&h

Ham Radio's most versatile tool! This 14-in-1 tool pocket-size toolbox is all you need for putting up antennas or working on rigs. Includes needle-nose pliers with wire cutters and jaws for gripping. Has flathead and Phillips screw drivers, knife, ruler, file, punch, more! Stainless steel, belt carrying case.

HamGear™ Waistpak

MFJ-6200 **$15.95** plus s&h

MFJ's *Ham Gear*™ *WaistPak*™ is the perfect hamfest, DXpedition or field day hands-free carry-all. Has amazing 9 spots to put your ham radio gear, tools, accessories and refreshments. Foam padded and comfortable. Made of heavy duty twill burlap for long life. Features tough webbed belting with solid plastic buckle.

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Tech Help: (662) 323-0549

EAS for probably close to 15 years. Marcia, KW1U presently director of TCC Cycle 1 and 2, is the new EAS Chair. Mark your calendars for March 31 RASON Ham Fest Waterford Senior Center, May 26 Natchaug Ham Fest in Vernon September 16 the CARA Ham Fest Newtown, CT and of course our own State Convention October 7 sponsored by The Meriden ARC in Wallingford at Mountain Side Resort. More details to follow as time approaches. The Candlewood ARA is once again sponsoring the CT QSO Party May 5-6 so watch for details. Net sess/QNI/QTC/NM: WESCON 31/367/66/KA1GWE; ECTN 31/283/72/WA4QXT; NVTN 29/168/64/KB1CTC; CPN 30/246/90/N1DIO;CN 29/98/58/N1AEH; CT NTSD rcvd 940, fwd 927 W1WCG. Tfc: NM1K 1796, KA1VED 296, KA1GWE 148, KB1CTC 144, WA4QXT 100.

EASTERN MASSACHUSETTS: SM, Phil Temples, K9HI—ASMs: WA1ECF, N1GTB, WA1IDA, N1UGA. ACC: N1DHW. BM: N1IST. OOC: K1LJN. PIC: N1PBA. SGL: K3HI. STM: NZ1D. TC: N1UEC. (SEC: open) e-mail list: ema-arrl@qth.net, web: http://www.qsl.net/ema-arrl. Please welcome N1UEC and N1DHW as our new TC and ACC, respectively. The recent Indian earthquake generated numerous health and welfare inquiries, according to N1NHZ of the Boston ARC. Acton-Boxboro ARC has reactivated after a period of inactivity and is enjoying new success. Contact KA1MWP for more info. Billerica ARS members gather for breakfast Sat. mornings at 0800 at the Ground Round, at I-495 and Route 110 in Chelmsford. WB1HBE reports New England QRP Club will tour ARRL Hq. W1CB demonstrated magnetic levitation using a cooled super conductor at a Barnstable ARC meeting recently! BARC and Cape Cod ARES are providing communications for the Hyannis Marathon. The Falmouth ARA received a grant from the Verizon Foundation for Amateur Radio education. EMA Web Site of the Month: Pilgrim ARC: http://people.ne.mediaone.net/w1py/PILGRIM-ARC.htm. It's cheery and colorful! Norwood ARC members assisted in the Norwood Festival of Lights celebration. Sturdy Memorial Hospital ARC held its Annual K1SKY Ragchew Meeting. WB1GGI planning a "spring cleaning" at Pentucket RC's repeater site. Whitman ARC Public Service Net meets Sunday mornings at 0830 on 147.225+ PL 67.0. Does your club have a publicity chairperson? Encourage him or her to become an ARRL Public Information Officer! Contact PIC N1PBA, n1pba@arrl.net for details. Preparations are underway for ham communications for the annual BAA Marathon from Hopkinton to Boston. This SM attended a recent joint RACES/ ARES/ SKYWARN coordination meeting at the Mass. Emergency Mgt. Agency bunker in Framingham. Have you checked into a RACES net lately? MEMA now uses the standard ARRL radiogram format for all official message traffic. Congrats to KW1U of Edgartown, recently elected to chair the NTS Eastern Area Staff. EMA STM NZ1D was recently appointed STM for WMA, too. Boston ARC gearing up for Aviation Expo at Logan Int'l Airport. Over 3000 high school students will see a ham exhibit, along with aviation, communications and technology displays. 73 de K9HI. Tfc: N1LKJ 523, KW1U 501, KB1AJ 312, NZ1D 249, W2EAG 208, KY1B 200, WA1FNM 82, K1SEC 68, WA1LPM 62, KD1LE 60, NG1A 54, K1BZD 44, N1AJJ 41, N1IST 40, N1LAH 29, KB1EB 25, N1TPU 16, KF4EYL 10, N1TDF 8, WA1VRB 6, N1ZFF 2.

MAINE: SM, Bill Woodhead, N1KAT—ASMs: WA1YNZ, KA1TKS. STM: N1JBD. BM: W1JTH. SGL: W1AO. ACC: KA1RFD. PIC: KD1OW. SEC: N1KGS. Asst. Dirs: W1KX, KA1TKS, K1NIT. Web Site: N1WFO, OOC: N1RY. On Feb.12, a delegation of Hams went to the State House in Augusta to speak in opposition to LD95, which would make it a criminal offense to use hand held electronic devices, including Amateur Radio, while mobile. At the time of writing this comment, all I can tell you is that you were very well represented. My sincere thanks go to those who spoke in opposition to this proposed legislation: Representative Tom Windsor, KA1LUN; Max Soucia, N1KGS, SEC; Michelle Mann,WM1C, former SM; Rod Scribner, KA1RFD, ACC, and former State Treasurer; along with George Harris,W1QUI. Unable to attend, Joe Kozak, W1AO, SGL, helped coordinate the statewide effort. I would also like to thank all the Hams who were in attendance: AA1WV, K1NIT, K1PIG, KD1KE, KC1AC, KB1AQE, N1EP, N1HOY, N1XDI, N1XUB. Feb 21 will be the workshop on LD95, and, hopefully, it will be killed there. 73, Bill, N1KAT. Tfc: W1KX 142, W1QU 68, W1BLT 41, W1JX 38, W1JTH 35, N1BJD 32, KA1RFD 23, KA2ZKM 15.

NEW HAMPSHIRE: SM, Al Shuman, N1FIK (n1fik@arrl.org) Web site (www.nhradio.org)—Congrats to the newly elected officers of the NARC. Chair: Don K1EER, Vice Chair: Darryl WA1GON, Tres: Mark N1ZYZ, Sec: Fletcher N1MEO. * Reminder * Hosstraders moves from Rochester, NH, to the Hopkinton Fairground, NH, at Exit 7 off I-89. The spring date is May 4-5, a week sooner than in previous years. Go to www.qsl.net/k1rqg or the NH Web page for more info. The NH ARES program continues to be rejuvenated. Your ARES leadership is in the process of putting together a series of non-classic training events that will better prepare you for a real activation. Please consider contacting Gary, N3CLZ, and joining ARES. Have you ever handled a piece of NTS traffic? It is a neat skill and not hard to learn. Come on up on the Granite State FM net every night at 8:30 PM on the 147.225 MHz repeater. Although the Triton Regional School has chosen to cut their entire entire Ham Radio program this year. Many thanks to John Lovering, KC1XG, who in the past 9 years has licensing more than 40 new Hams between the ages of 12-18. That is dedication! 73- Al, N1FIK, 487-3333. Net NM/sess/QNI/QTC: GSFM N1RCQ/31/215/40; GSPN WB1GXM/31/131/87; VTNH WA1JVV/31/164/111. Tfc: W1PEX 933, N1NH 72, WA1JVV 65, W1ALE 47, WB1GXM 31, N1CPX 28, K1STV 11.

RHODE ISLAND: SM, Armand Lambert, K1FLD—Newport County Radio Club champions interest in Amateur Radio by enticing High School Students to build regen short wave radios featured in *QST* achieving a high level of success, I'm sure the students will always remember the helping hand from their local radio club, this is a great way to encourage replenishment of our ranks, Hooray for NCRC! Meanwhile the Blackstone Valley ARC stirs local interest after a terrific article on the club was published in the Sunday Feb 4th edition of the Woonsocket Call, another Plus for Amateur Radio getting into the Media. Recent elections at Ocean State ARG installed the following leadership for 2001: Judy, KC1RI, Pres. Russ, K1CH VP. Dave, KB1AKJ, Sec/Treas. Trustee: Joe, K1CR. On the Board: Al, N1YKG, Joe W1IJ, Guiseppe, K1PG, Sokkong, KB1AAQ, and Mike N1VSU. Providence Radio

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Get very low radiation angle for exciting DX, automatic bandswitching, omni-directional coverage, low SWR. Handles 1500 Watts PEP SSB.

MFJ's unique *Elevated Top Feed*™ elevates the feedpoint *all the way to the top* of the antenna. It puts the maximum radiation point high up in the clear where it does the most good -- your signal gets out even if you're ground mounted.

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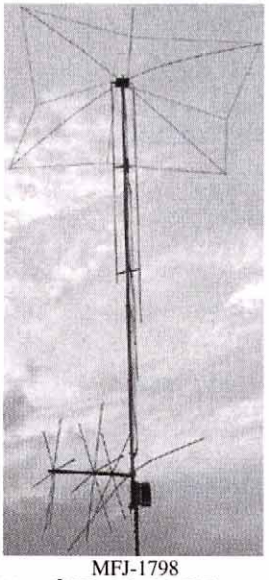

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MFJ's Super High-Q Loop™ Antennas

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MFJ's *tiny* 36 inch diameter loop antenna lets you operate 10 through 30 MHz *continuously* -- including the WARC bands!

Ideal for limited space -- apartments, small lots, motor homes, attics, or mobile homes.

Enjoy both DX and local contacts mounted vertically. Get both low angle radiation for excellent DX and high angle radiation for local, close-in contacts. Handles 150 watts.

Super easy-to-use! Only MFJ's super remote control has *Auto Band Selection*™. It auto-tunes to desired band, then beeps to let you know. No control cable is needed.

Fast/slow tune buttons and built-in two range Cross-Needle SWR/Wattmeter lets you quickly tune to your exact frequency.

All welded construction, no mechanical joints, welded butterfly capacitor with no rotating contacts, large 1.050 inch diameter round radiator -- not a lossy thin flat-strip -- *gives you highest possible efficiency.*

Each plate in MFJ's tuning capacitor is welded for low loss and polished to prevent high voltage arcing, welded to the radiator, has nylon bearing, anti-backlash mechanism, limit switches, continuous no-step DC motor -- gives smooth precision tuning.

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MFJ-1782, $339.95. Like MFJ-1786 but control has only fast/slow tune buttons.

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MFJ-1621 **$89.95** Ship Code A

MFJ-1621 lets you operate in most any electrically free area -- apartment, campsite, hotel, the beach, etc. DXCC, WAZ, WAC, WAS have been won with MFJ-1621! Work 40, 30, 20, 17, 15, 12 and 10 Meters with a telescopic whip that extends to 54 inches. Mounted on a sturdy 6x3x6 inch cabinet. Built-in antenna tuner, field strength meter, and 50 feet of RG-58 coax cable. Handles 200 Watts.

MFJ's G5RV Antenna

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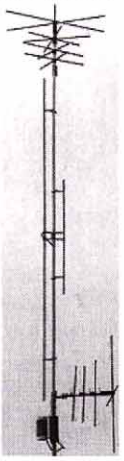
Covers all bands, 160-10 Meters with antenna tuner. 102 feet long, shorter than 80 Meter dipole. Use as inverted vee or sloper to be more compact. Use on 160 Meters as Marconi with tuner and ground. Handles full legal limit power. Add coax feedline and some rope or other nonconductor and you're *on the air!*

MFJ halfwave vertical

6 bands: 40, 20, 15, 10, 6, 2 Meters . . . No radials or ground needed



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Association reports the following leadership for 2001: Pres Paul W1PRA, VP Dave K1DT, Sec John W1GS, Treas John KZ1K. BOD: Neville N1JDA, Paul N1RHS, Zaven W1IUX, Congratulations to all elected club officials.

WESTERN MASSACHUSETTS: SM, William C. Voedisch, W1UD, w1ud@arrl.org—ASM: N1MAP. ASM (digital) KD1SM. STM: NZ1D. SEC: K1VSG. OOC: WT1W. New England's coldest months have passed. Have you had the opportunity to check your antenna installation since last fall? I was surprised one evening to find my 80 meter dipole was not loading normally. Looking with a flashlight, I found ice had fallen from the edge of the roof onto my open wire feeders. A trip up the tower in the dark with a new length of feeder line solved the problem. Our bands are in excellent shape with opening to all parts of the world. A few dxpeditions will be active this spring from various exotic locations. Take advantage of the opportunity to contact them. Nobody knows when this sunspot cycle will start on its downward swing. Throughout the section, many have reported their winter projects have been progressing well. It seems that QRP rigs, either in kit form or roll your own, are popular. One member reported that he built a multi-band transceiver from a kit. It's working and he is getting excellent reports both on CW and SSB. Field Day is fast approaching. Plan now and avoid the problems that usually arise from lack of planning. 73, Bill.

NORTHWESTERN DIVISION

ALASKA: SM, Kent Petty, KL5T — Alaska PRB-1 Bill Introduced as SB 78. Contact your Senators and Legislatures to let them know you expect them to support this bill. Big thanks to Dan Squires (KD7WN), Rob Wilson (AL7KK), and Greg Milnes (W7OZ), as well as ARRL support staff for their tireless efforts to make this happen. Yukon Quest Sled Dog Race supported by extensive VHF packet and voice network headquartered in Fairbanks. Hats off to Benny Benevento (NL7XH) and other Fairbanks and Central Alaskan hams providing superb coordination and support! Super job by Teresa Nunes (KL0WW) and Gerianne Thorsness (WL7RY) for their presentations to the Girl Scout Susitna Council during their Women in Science day! Anchorage hams provide ATV support to Fur Rondezvous Grand Prix thanks to Phillip Mannie (KL0QW)…how about that?! Much going on in Alaska. Get your fellow hams involved! 73!

EASTERN WASHINGTON: SM, Kyle Pugh, KA7CSP—The unending work of keeping Amateur Radio alive and well never stops. In Olympia work goes on to expand and amend PRB-1 so that local governing bodies can not restrict antenna height to less than 70 feet without a clearly defined health, safety, or aesthetic reason. In January the ARRL Board met and discussed many issues, such as keeping CW as a licensing requirement in the USA, re-alignment of 40 meters, preservation and protection of our frequencies, interference, new technologies, and a necessary dues increase. Hamfests: Spokane on April 7, Yakima on April 21-22. All OO stations reporting monitoring activity for January. Good job OOs! For the year 2000 total OO hours reported was 6314. 73, KA7CSP. Net Activity: WSN: QNI 763, tfc 205; Noontime Net: QNI 9021, tfc 199; WARTS: QNI 3676, tfc 105 Tfc: W7GB 196, K7GXZ 158, KA7EKL 87, K7BFL 51, KK7T 15. PSHR: W7GB 138, K7GXZ 118.

IDAHO: SM, M.P. Elliott, K7BOI — OOC: N7GHV. SEC: AA7VR. STM: W7GHT. Since this will not appear in QST until the April issue it is time to remind each of you that Hamfest time is upon us! At this time I am only aware of two Spring Hamfests in Idaho this year - Idaho Falls and Caldwell. If you have the dates for these events please let me know so they can be put on the Web site. If your club or group is planning a 2001 hamfest get the dates to me so that we can get you some publicity. It is also time to plan for those public service events - fun runs, walks, parades, etc. Another activity is ARRL Field Day. The Idaho Section will again award plaques for the high individual and club Field Day scores. 73 - Mike, K7BOI. Tfc: W7GHT 288, KB7GZU 94, WB7VYH 49. PSHR: W7GHT 121, WB7VYH 14. Nets: FARM-31/3228/41/W7WJH; NWTN - 31/1199/74/KC7UND; IDACD-23/475/7/WB7VYH; IMN-31/483/136/W6ZOH. http://id_arrl.homestead.com/mainpage.html.

MONTANA: SM Darrell Thomas, N7KOR—The Hellgate Amateur Radio Club of Missoula provided emergency communications for the 7th annual First Night Missoula on New Years Eve. Using a portable repeater set up on the roof of a downtown building the coordinated activities at 37 locations. Participating were KF7BQ, W7DHB, KD7KE, K7PX, KC7RBC, N7STM, N7TAE, N7TYS, KB7UNW, N7VGY, NL7WB, and KC7YTK. Good job folks. The Yellowstone Radio Club held their annual dinner on January 27, 2001. Amateurs receiving awards at this event were Vince Fiscus, KB7ADL, YRC Ham of the Year, Mark Idhe, KB7SFA, Elmer of the Year, Don Sturtevant, K7PO, an outstanding service award. Congratulations to all. Net/QNI/QTC/NM MSN 137/1 W7OW, MTN 2693/49 N7AIK, IMN 483/136 W6ZOH. PSHR: N7AIK 115.

OREGON: SM, Bill Sawders, K7ZM—ASM: KK7CW. SEC: WB7NML. STM: W7IZ. SGL: N7QQU. OOC: NB7J. ACC: K7SQ. Our best wishes go out to Oregon Section Technical Coordinator, Bernard Fineberg, AB7HB. After serving as STC for nearly 4 years, Bernard has left for greener pastures in Texarkana, Texas. Bernard has done a fine job filling the position, and we wish him well. His departing has created an opening for a new Section Technical Coordinator, and I will be accepting applications through April 30th for anyone interested in helping others in dealing with technical solutions. Larry Ross, N7LA, has assumed the VE Liaison position in Hermiston, where Amateur exams will be given upon request. Very few complaints have been heard regarding the new increased dues structure implemented by the ARRL. Most of us realized the ham population is getting older and fewer people are joining our ranks. However, there seems to be more of an interest in the younger population getting involved in Amateur Radio. Let's hope so. Don't forget the Northwest Division ARRL Convention, June 1-3 at Seaside, Oregon. Once again, Oregon Assistant Section Manager, Marshall Johnson, Sr, KK7CW, will be presenting a number of seminars. If you're planning to attend one, better get there early, as most are standing-room only! New officers for Central Oregon Radio Amateurs include President, Mary Winter, N7RGD. Vice President, Bob Naidis, K6KYN. Secretary, Wade Linschied, KD7ILP and Secretary, Mark Rhodes, KC7LUD. Good luck to all, and keep in touch. NTS traffic totals for January: N7DRP

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Plus much, much more!

32K RAM, IC sockets for easy service. 256K ROM, speaker jack, lithium battery backup, RS-232 and TTL serial ports, radio cable (you add a connector for your radio), *Fast-Start*™ manual, much more!

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Why tie up your expensive 2 Meter rig on a single packet channel? For an incredibly low $119.95, you can enjoy dedicated high performance packet from 1200 to 9600 baud on 2 Meters, 24 hours a day!

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MFJ-9606, $159.95. Use Voice or Packet with MFJ's new 6 Meter *FM Communicator*™ Transceiver. Perfect for No Code Techs and Veterans alike. Crystalled for 52.525 MHz calling frequency. Easy to re-channel. **MFJ-9606X, $169.95.** Includes Mic.

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You won't believe your eyes when you see solid copy from signals completely buried in QRM! The MFJ-1278B/DSP, your transceiver and computer are all you need for exciting digital QSOs! You'll discover a whole new world of ham radio. You'll communicate in ways you never knew existed!

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MFJ-1278B/DSP gives you DSP and 10 digital modes -- Packet, PACTOR, AMTOR, RTTY, Color SSTV, 16 Gray Level Fax/Weather FAX, ASCII, Navtex, CW, Memory Keyer.and is GPS compatible!

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Switch between your microphone and TNC by pushing a button!

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MFJ-1272BX/1272MX, $39.95, for PK-232.
MFJ-1272BYV/1272MYV, $39.95, for KAM VHF/KPC3.
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TNC Type / Radios	All MFJ TNCs and Multimodes	KAM VHF[6]/ KAM HF[6]/ KPC3[7]/ KPC9612[7]	PK-232	PK900/PK96/ PK12/DSP232 /PacComm/ other TNC-2 compatibles
Alinco[8]/Stdrd HT	MFJ-5022	MFJ-5022YV	MFJ-5022X	MFJ-5022
Icom[1]/Yaesu/ Radio ShackHTs	MFJ-5024	MFJ-5024YV	MFJ-5024X	MFJ-5024B
Kenwood[2] HTs	MFJ-5026	MFJ-5026YV	MFJ-5026X	MFJ-5026
Yaesu 8-pin	MFJ-5080	MFJ-5080YV MFJ-5080YH	MFJ-5080X	MFJ-5080Z
Icom[3] 8-pin	MFJ-5084	MFJ-5084YV MFJ-5084YH	MFJ-5084X	MFJ-5084Z
Kenwood/Alinco 8-pin	MFJ-5086	MFJ-5086YV MFJ-5086YH	MFJ-5086X	MFJ-5086Z
Yaesu 8-pin modular	MFJ-5080M	MFJ-5080MYV	MFJ-5080MX	MFJ-5080MZ
Icom[4] 8-pin modular	MFJ-5084M	MFJ-5084MYV	MFJ-5084MX	MFJ-5084MZ
Kenwood 8-pin modular	MFJ-5086	MFJ-5086MYV	MFJ-5086MX	MFJ-5086MZ
Radio Shack 8-pin modular	MFJ-5088M	MFJ-5088MYV	MFJ-5088MX	MFJ-5088M

1. does not include IC-W2A
2. does not include 2500
3. does not include 25A, 255A
4. does not include IC-100H, IC-2700H
5. YV for KAM VHF port, YH for KAM HF port. Other Kantronics use YV models
6. YV for KP9612 1200 baud port
7. YH models for KPC9612 9600 baud port
8. Excludes DJ-100, 120T, 200, 500

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180, N7YSS 96, W7IZ 81, W7VSE 74, KC7SRL 68, K7NLM 65, KC7ZZB 55, KC7SGM 33, KK1A 9.

WESTERN WASHINGTON: SM, Harry Lewis, W7JWJ—When your telephone is ringing, your pager buzzing and the squelch on the local two meter repeater is open, there is a good chance for a SAR call out. Such recently happened in Bellingham when members of the Mount Baker club were activated to search for a missing person under the direction of a Deputy Sheriff and the hams organized under KB7PKL. Participating in this successful search KC7CAA, KC7OAS, KK7LK, WA7TTD and W7KKCN. It is with regret that we report these following calls as Silent Keys, KB7NNJ, N7USB, W7WFP, K7LHV and K7IRO. Via SEC N7NVP this report: San Juan Co's EC, Laura, KD7FRE, reports they have replaced all the components in their repeater and it is back on the air. Dist 3 DEC Monte, W7MLS; Tom, W6QJI and Wilmer, K7MNCL, assisted Mason Co. SAR looking for a missing evergreen worker. Monte's Lesson Learned: the person coordinating the mobilization should probably not be a respondent as someone should be available to coordinate follow on staffing requests and to track responding volunteers. This is a valuable lesson that needs to be learned before going into the field, especially during a major event. Clark Co held a 2-meter simplex contest with many of the ARES/RACES members participating. Similar exercises are planned for May or June. What a wonderful way to practice your simplex skills! The Lower Columbia ARA hosted the 3rd annual APRS Winter meeting http://nwaprs.org/eventslist.htm. Thanks to Dave, K7GPS, Bob, KB7ADO, and Rob, WA7ROB. Les Tomminger, W7UFI, who has served as EC of Snohomish Co but is now relieved by Will Amsden, N7NVV. Thanks for your service, Les, and welcome Will. A new challenger to K7BDU for the most traffic handled per month from Official Observer W7BO. Third party in the public interest helps sustain our Amateur Radio Service, so please report you traffic handled to your NCS and/or to the Section Traffic Manager Pati, W7ZIW. Some Amateurs simply spend more time listening that transmitting and the elite have appointments as Official Observers. Kudos to those that serve. 73.

PACIFIC DIVISION

EAST BAY: SM, Andy Oppel, N6AJO—ASMs: NJ6T, KE6QJV. SEC: KE6NVU. DECs: KE6QJV/Alameda County, KO6JR/Contra Costa County, WA7IND/Napa County, K6HEW/Solano County, N6UOW/Training, W6CPO/Technical Services, KQ6TM/Section Plans and Administration. OOC: KD6FFN. STM: W6DOB. ACC: NJ6T. EB Web Page: http://www.pdarrl.org/ebsec/. Webmaster is KB6MP. My new call is N6AJO. ASM Connelly now has call NJ6T. HRC officers for 2001 are N6MON/Pres, K6BIR/VP, N6OJJ/Treas, KF6HFK/Par, FK6YQY/SAA. CCCC welcomed new member KF6OGA. Both CCCC and MDARC mourned the loss of longtime member AC6WF, who was also a dedicated OO for many years. SARS reports that the estate of KF6RZ donated the entire station to Yountville Veterans Home, for which the residents are most grateful. CCCC mourned the loss of member KD6KPT. VVRC thanked N6WVF for his years of service editing their newsletter. He is replaced by W6ROY, W6OMF and KF6KFP. I enjoyed meeting with EBARC and briefing members on the ARRL Field Organization and the duties of a SM. I hope to see you all at the VVMRC Hamfest on April 28th (126 1st St West, Sonoma). January tfc: W6DOB 662, WB6UZX 30, KE6QR 13. PSHR: W6DOB. BPL: W6DOB. Tfc nets: NCN1/3630/7PM; NCN2-slow session/3705/9 PM; NCN-VHF/145.21/7:30 PM; RN6/3655/7:45 PM & 9:30 PM; PAN/3651/7052/8:30 PM.

NEVADA:SM, Jan Welsh, NK7N—ASM: Dick, W6OLD. SEC: Paul, NN7B. ORS: N7CPP. Assistant SGL N7YQ will be busy rounding up support for AB61. The following address is where you can find antenna Bill AB61 that should help us in NV. http://www.leg.state.nv.us/71st/reports/history.cfm?ID=3508. It was proposed by NV Assemblyman Robert Beers, WB7EHN. Remember Ray Rawson, KB7ORC, is a State Senator also. URL for NV State Reps: http://www.leg.state.nv.us/71st/Legislators/map/Amap.cfm for State Senators: http://www.leg.state.nv.us/71st/legislators/map/Smap.cfm. Also Bob Coffin in the Senate was instrumental in the waiver of fees provision on ham plates several years ago. Considering the rules and regulations around the State have almost precluded Amateurs from erecting an antenna to some areas, AB61 is definitely compulsory reading FARS and LVRAC looking for a new Field Day site. RARA is planning on Tonopah Mining Park as their choice of location this year. Looking forward to more info on locations. 73, Jan, NK7N. Tfc: W7VPK 60, N7CPP 13, K7NHP 1, NV7YL 1.

PACIFIC: SM, Ron Phillips, AH6N—We lost a Honolulu DX Club charter member, Johnny Oka, ex-KH6DQ. Johnny was the Hawaii Section QSL representative for several decades sorting and distributing QSLs out of his Aiea home. Greg, WB6FZH reports the KARC Meeting Announcement, Saturday, January 13th at Ho'ommaluhia Botanical Garden, 0930. Hamfest 2000 Report, Field Day 2000 Report, Radio Contests Dec 30 to Feb-11, Swap & Sell, EARC Oahu QSL Bureau Update, HARC Meeting Place Change, QCWA Honolulu Chapter a Reality. Lee Wical, KH6BZF, reports the Koolau ARC has obtained Saturday, 13 Oct as the date for the new upcoming ham convention. It will be held at the Pearl Harbor facility. The Honolulu senior (makuli) Amateur Radio Operators breakfast gathering is now held at ZIPPY'S restaurant, on Vineyard at the corner of Maunakea Street Makai, across from the C&C Foster Botanical gardens at 8:30 AM each Thursday. Ms Joan Peters, KA4DPW, is the newly elected President of the Honolulu Chapter (#206) of QCWA. By the way, Joan, was elected as VP of the national QCWW (Quarter Century Wireless Women, Inc.) Husband, John Peters, K1ER/KH6, was recently re-elected to the Honolulu ARC. Dean Manley, KH6B, visited American Samoa and Independent Samoa from January 13-29. 5W0WM from Apia was used on QRP and worked all over the world. Congrats to a fine venture, Dean. 73, Ron, AH6HN.

SACRAMENTO VALLEY: SM, Jerry Boyd, K6BZ—Since many will receive this issue in mid-March, it is not too late to register for EMCOMM 2001 which will be held on March 31st near Redding. Any amateur from any Section interested in increasing emergency communications capabilities is invited. Contact SEC-N K6SOJ (K6SOJ@arrl.net) for info. In visiting clubs recently I have received a lot of input regarding what members believe the League's position should be relative to

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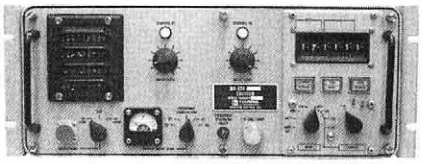

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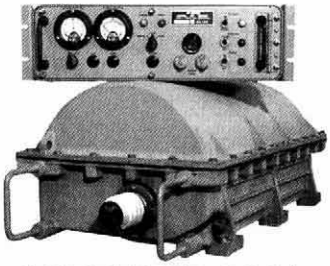

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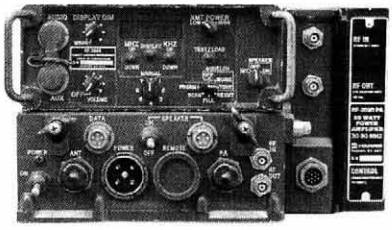

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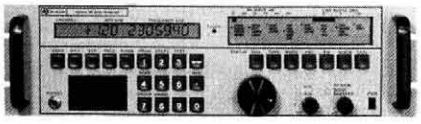

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the Morse code requirement. If you have not already let your Division Director know your views on the subject, please do so. Hams throughout California should continue to prepare for "rolling blackouts." Our state's energy crisis is far from over. Winter, and summer in particular, could force rolling blackouts. Hospitals and schools may need our communications help during such incidents. Good article in GEARS January 2001 Newsletter on why attendance at club meetings is important. Congrats to new GEARS Newsletter editor W6TKE. There has been some discussion of forming a Northern California Amateur Radio Emergency Services non-profit corporation as a funding vehicle for various EMCOMM projects (repeaters, mobile communications vehicle, etc.) If you have some interest in such an endeavor, please contact me. Until next month, 73 de K6BZ.

SAN FRANCISCO: SM, Len Gwinn, WA6KLK—ASM: KH6GJV. SEC: KE6EAQ. Humbolt County is hosting the San Francisco Section Convention on June 22-24. Yes, this is Field Day weekend, but it is the open date for space, and it coordinates with other activities in the area for families. Talks are scheduled as well as other events. This will be a great time for northern California hams. Rich, KF6ZGY -email acts1x8@juno.com, is looking for help for the annual Bay to Breakers race May 20. This is an excellent event for our participation and exposure. ARRL yearly rates are going up shortly. Renew your membership now to maintain some dollars in your pockets for the fleamarkets. Mendocino hams KD6BQO and KE6SFP were involved along with W0ANH in the possible sinking/rescue of people from a boat near Los Angles. The CG found nothing in the area but complimented the hams for their prompt action. Field Day and Kids Day activities are being planned by many of the section clubs. Join in and enjoy helping new people interested in our fantastic hobby. The time is now to start thinking about a shift in gears to the summer emergency programs. Contact your local club and/or your local DEC/EC for information on how you can assist. CDF is always looking for volunteers also and they have a good training program. ARES is growing larger in the section so come join us.

SAN JOAQUIN VALLEY: SM, Donald Costello, W7WN — ASMs: Mike Siegel, KI6PR, John Lee, K6YK, Pat Fennacy, W6YEP. SEC: Kent LeBarts, K6IN. OOC: Victor Magana, N1VM. OCC: Charles McConnell, W6DPD. STM: Fred Silveira, K6RAU. Affiliated radio clubs of SJV. Section should submit their annual reports by going to arrl.org and the club search to get their report. Affiliated club annual reports may only be updated via the Internet now. The Central California DX Club reports new officers: Pres. W6PSQ, 1st VP: KN6YD, 2nd VP: W6FRH, S/T: W6DPD. Directors: W6GN, K6XJ and W6UC. New officers for the Fresno ARC are: Pres. KF6GKC, VP: KF6CL, Sec.: W6PXM, Treas.: WA6HII. Fresnos Ham of the Year for 2000 is Charles McConnell, W6DPD. In matters of traffic handling please contact our STM Fred Silveira, K6RAU, at k6rau@hotmail.com. The National Weather Service in Hanford is actively involved in working with SJV Section hams in training weather spotters and using drills to improve performance of information on severe weather in the field. Scott Borgioli is the radio officer at NWS who is very active and doing a great job. You can e-mail Scott for information on becoming active in the SKYWARN program at ke6itf@yahoo.com. If your radio club has news that it would like included in the Section News submit it via e-mail: w7wn@arrl.org.

SANTA CLARA VALLEY: SM, Glenn Thomas, WB6W — SEC: KM6GE. BM: WB6MRQ. TC: WA6PWW. OOC: KB6FPW. SCV Homepage is http://www.pdarrl.org/scvsec - My apologies for missing last month. The Foothill College Electronics Flea market will be meeting again on the 2nd Saturday of each month. Turn your junk into cash and vice versa! ECTAR (Emergency Communications Through Amateur Radio), one of our local ARES based clubs in Monterey County supported the AT&T Pebble Beach Golf Tourney on very short notice and were able to provide communication at times when the commercial radios and cell phones could not. Thanks to the folks who participated and did us proud! The Garlic Valley ARC meets on the LAST Saturday of each month, at the Little House Restaurant in Gilroy on Monterey Avenue. The meeting follows breakfast at 8 AM. For information, contact Tony Armendariz, AD6ID, 408-683-2025. The West Valley ARA was to have heard about "Spread Spectrum Ham Transponder Project Proposal for the International Space Station" at their January meeting. Quite a title! They meet every 3rd Thursday at 7:30 PM in the Campbell Community Center in the Mary Campbell room. The South County ARS meets the 3rd Thursday of each month at 7:30 PM in room 207 of the San Carlos City Hall. Finally, WB6W spoke at the Santa Cruz County ARC on the OO/Amateur Auxiliary program. SCCARC meets at 7:30 PM on the third Friday at the Dominican Hospital, 1515 Soquel Dr, Santa Cruz. 73 de Glenn WB6W. Tfc: W6PRI (Dec) 2.

ROANOKE DIVISION

NORTH CAROLINA: SM, John Covington, W4CC—SEC: KE4JHJ. STM: N0SU. BM: KD4YTU. TC: K4ITL. PIC: KN4AQ. OOC: W4ZRA. SGL: AB4W. ACC: vacant. http://www.ncarrl.org. Our commitment to public service has been one of the most rewarding things Amateur Radio has to offer each of us and our communities. I hope each of us will carefully consider what you can do in the next few months to be better prepared to be of service. I encourage each of you to become active in your local ARES groups and clubs. You can learn a lot from discussions with others. Examine your station and see if there are improvements needed that can make it easier for you to respond. Decide what kind of service you are able and willing to provide, and prepare yourself to do the best job possible. Our goal is to be prepared to handle communications when asked by our community and our served agencies. Keep in mind we are a backup communications resource, and if no communications emergency exists, we won't be activated. However, if we are prepared to serve when needed, then we have done our job. Dexter McIntire, W4DEX, of Locust has been busy experimenting with LF beacons and receivers for years, and now ARRL Web has reported that Dexter has confirmed received DFCW signals from 2 amateur stations in England on 136 kHz. Great to see that we still have some experimenters among us. Dexter has also been active on microwave bands for years. Sorry to report that Charlie, W4ROO, of Hamlet has become a Silent Key. Hope to see you

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144-148MHz tx; 118-174MHz rx • 50w • MIL-STD 61 multi-funct. mem. channels plus 1 call channel • Mem. name funct. • DTSS selective calling • Multi-scan capability • Dual menu sys. • Multi-funct. mic • DTMF mem. funct. CTCSS tone enc; opt. dec • 13.8V DC @ 11A • 5½"w x 6⅜"h x 6½"d.. **Special $169.99**

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at some of our upcoming hamfests: Down East (Kinston) March 25, Raleigh April 8, Catawba Valley (Morganton) April 14. January Traffic: W4EAT 405, NC4ML 332, AB4E 221, N4AF 209, AA4YW 139, KI4YV 137, KE4JHJ 102, AD4XV 66, W4IRE 47, KE4AHC 38, WA2EDN 24, W4CC 23, WA4SRD 18, AE4HJ 15, NT4K 10, KB8VCZ 10, N8UTY 5, KT4CD 5, N0SU 2.

SOUTH CAROLINA: SM, Patricia M. Hensley - N4ROS—Congratulations to the graduates of the Amateur Radio Emergency Communications Course and Certification Program. SC was chosen as the first state to offer this program in a seminar format, and it was very well received. A second seminar will be offered in several months. Amateurs interested in the next session, please notify me by the end of April. Thursday night, February 8, provided a very memorable experience for me. My OM and I were able to watch the Space Station travel overhead followed by the Space Shuttle. My OM was especially excited because he had also seen Sputnik over 40 years earlier. Contacts with astronauts living in the Space Station will be routine in the near future. The concept of DX will assume a totally new meaning. This opportunity could become the needed stimulus for encouraging youngsters to develop an interest in amateur radio. I would like to request that those amateurs currently involved with satellite communication notify me in order to create a resource directory for schools. A number of club presidents have already contacted me regarding the President's Council; we would like to have representatives from all clubs in SC. Looking forward to the Upstate Hamfest. Jan. Tfc: KA4LRM 82, W4DRF/AF4QZ 46, WD4BUH 22, KA4UIV 16, K4BG 12, KQ4SY 9, KG4FQG 6, K4JMV 4.

VIRGINIA: SM, Lynn Gahagan, AF4CD—ASM: KC4ASF. SEC, OOC: KR4UQ. STM: W4CAC. ASM/A: KE4MBX. ASM/B: W4TLM. ASM/C, TC: W4IN. ASM/D: KF4LGV. PIC: W2MG. Greetings everyone! W4CAC, our STM, reports that the SVEN, Shenedoah Valley Emergency Net is once again passing NTS traffic into and out of the Valley. I would like to thank KF4VED and everyone else who is involved for getting the traffic flowing and the reports coming. If you would like to participate in the SVEN, it meets each evening at 7:15 PM on 146.820 in the Winchester area. K4HYE reports the passing of W8VT, Wayne "Red" Snider. Red was 69 years old and was first licensed as WB8TFI 28 years ago in the Cleveland OH area. He was an Extra class operator, ARRL VE, W5YI VE, served as Secretary of Giles Amateur Radio Assoc. for nearly two years. He enjoyed woodcarving, hunting-fishing and was a Pastor at the Coulters Chapel Church near Lindside, WV. Wayne was a resident of Narrows, Va. On February 10th, K4DND DEC 3 hosted the first live ARES/RACES training session for 2001 in Charlottesville. Ninety-three other enthusiastic amateurs and I attended the session, which lasts 5 hours. Virginia ARES/RACES has been holding free training since 1997 throughout the state, with over 500 attending the sessions to date. Ed Harris, KE4SKY, is the State Training Officer, and has done a fantastic job in developing the training materials, which can also be seen at www.aresva.org. Our SEC reports the first Statewide DEC meeting was held at the Charlottesville. Also the Virginia Digital Emergency Net held a meeting which ASM Jim Dodd, KF4LGV hosted. All the meetings were well attended. Bill Arnold, KD4TOR, was recognized for his efforts in urging his friend Delegate Joe May to insure the General Assembly of Virginia recognized the ECOMM ARES/RACES members provided in Hurricane Floyd. Bill's urging resulted in the Joint House and Senate Resolution commending Virginia ARES/RACES members. Don't forget to check into one of the many Virginia nets. Whether it's the Freeloaders, VFN, VSBN, VNL, VNE, VTN, VLN, SVEN, NVTN, SVTN, VSN, or the ODEN, there's a net for everyone. Please support them. DX IS! 73 de AF4CD. Tfc:W3BBQ 239, KV4AP 192, K0IBS 145, WA4DOX 131, W4CAC 109, K4YVX 98, K4MTX 93, KE4PAP 68, N4ABM 64, WB4ZNB 52, KR4MU 47, KV4AN 31, W4SEE 22, KU4MF 16, W4YE 13, K4JM 13, W4MWC 8, WB4UHC 7, KU4TM 4, KB4CAU 4, N4FNT 2.

WEST VIRGINIA: SM, O.N. (Olie) Rinehart, WD8V—STM: KC8CON. SEC: W8XF. ASEC: KA8ZOO. SGL: K8BS. TC: K8LG. OOC: N8OYY. ACC: WD8MKS. APRSC: W8XF. PIC: N8TMW. As usual, I am fighting a deadline and the time laps between editing and publishing of this column. My comments now are last month's news and will be published next month. I assume you are all aware of the ARRL membership dues increase. It is a necessary increase to cover expenses and my suggestion is to go for Life Membership now, locking the current rate. The Leagues standing on Morse code has not really changed, they are just restating and updating for the IARU and WARC sessions. It has certainly been a sad month in regard to SKs. We here in West Virginia have lost a great many in a very short time. It was well put by Juddie, KC8CON, when he stated, "I sure am going to miss them, they knew so much that I haven't learned yet. Who will teach me know?" See you all at the Hamfests and Conventions. 73. Tfc: KA8WNO 237, WD8DHC 140, W8YS 123, WD8V 72, KC8CON 61, WW8D 60, W8WWF 52, N8FXH 16, KC8OJN 16, N8BP 11, N8NMA 9, PSHR WD8V 193, W8YS 174, KC8CON 160, WD8DHC 138, KA8WNO 118, N8NMA 30; WVFN 1324/176/31 KC8CON; WVMDN 875/57/31 WW8D; WVN E 115/37/31 W8WWF; WVN L 128/42/31 W8WWF; ARES/RACES 46/14/02.

ROCKY MOUNTAIN DIVISION

COLORADO: SM, Tim Armagost, WB0TUB—ASM: Jeff Ryan, N0WPA. SEC: Mike Morgan, N5LPZ. STM: Mike Stansberry, K0TER. ACC: Ron Deutsch, NK0P. PIC: Erik Dyce, W0ERX. OOC: Karen Schultz, KA0CDN & Glenn Schultz, W0IJR. SGL: Mark Baker, KG0PA. TC: Bob Armstrong, AE0B. BM: Jerry Cassidy, N0MYY. In early February there was an APRS signal moving across Colorado. Turns out it was a gas balloon piloted by Troy Bradley, KC5ORZ, who was attempting to set a distance record. Unfortunately, he was forced to land early in Amarillo due to snow accumulation on his envelope. Speaking of balloons, a new distance record for a contact via a balloon-borne repeater was set on January 13, 2001 between stations N7DMO in Riverton, WY, and N0KQX in Garden City, KS, with a distance of 530 miles. (The previous record was 250 miles). The contact took place during the flight of EOSS-46 launched from Windsor, CO. See www.eoss.org for upcoming flights that would lead to future attempts. The Colorado Section made a pretty good showing in the 2000 10 GHz & Up contest. John, WD4MUO/0 , also broke the all-time record for 10 GHz Contest total points. Congrats! New Section appointments: We now have two DXCC Field Checkers in Colorado: Barry Mitchell, N0KV, of Parker, and Ross Harrell, N0ZA, of Grand Junction. See www.arrl.org/dxcc for information about field checking of DXCC cards. Congrats to Barry and Ross on their appointments, and thanks for volunteering. The Pikes Peak Radio Amateur Association turned 50 last November and I neglected to say "happy anniversary". The origins of the club date back to before WWII- and the existing club was reorganized after that war. It's an ARRL Special Services club in continuous operation since November of 1950! Thanks to W5VSI, WB0TUB, K0SU, N0KIC and W0RPK for input to this month's column. If you have items you'd like printed here, e-mail news to me: n0wpa@arrl.net. Is your club newsletter available electronically? E-mail that to me as well! 73, de N0WPA.

NEW MEXICO: SM, Joe T. Knight, W5PDY—ASM: K5BIS & N5ART. SEC: K6YEJ. STM: N7IOM. NMs: WA5UNO & W5UWY. TC: W8GY. ACC: N5ART. New Mexico Roadrunner Net handled 118 msgs with 1521 checkins. New Mexico Breakfast Club handled 203 msgs with 1114 checkins. Yucca Net handled 19 msgs with 674 checkins. Caravan Club Net handled 2 msgs with 41 checkins. SCAT Net handled 10 msgs with 839 checkins. Four Corners Net handled 31 msgs with 326 checkins. GARS Net handled 9 msgs with 33 checkins. Rusty's Net handled 82 msgs with 874 checkins. Valencia County Net handled 14 msgs with 40 checkins. Deming ARC Net handled 15 msgs with 84 checkins. Well, the Winter Tail Gate at Del Norte High School (ABQ) was about a freeze-out. I was told there were about 25 hardy souls that braved the cold and snow for about 2 hours. We sure hope for better weather at our ABQ Spring Tail gate Apr 28 to be held at St Paul's Methodist Church starting at Sun up and lasting until about 2 PM. Then on the Mesilla Valley "Bean & Chili Feed" to be held in Las Cruces at their club house on Apr 29 starting about 8 AM. The West TX section convention is May 5-6 in Abilene. The Flagstaff, AZ (Ft Tuthill) convention is July 27-29. Very sorry to report the passing of KC5IGI, W5DO and W5ORP. They will all certainly be missed. Best 73, W5PDY.

UTAH: SM, Mel Parkes, AC7CP—Have you volunteered to help with the 2002 Winter Olympics, if you haven't it still is not to late to get involved. We still need many hams to help out in all areas. During the 2002 Winter Olympics there will be a great need for volunteers. Especially important to us is finding those who are qualified to provide communications. Radio traffic between Olympic venues and officials will be important especially in the event of any disaster. Public Safety group UOPSC has numerous positions available. If you are interested in helping contact Brent Thomas, AC7H, or go to the Web site http://www.cem.state.ut.us/Radio/2002Quest.htm. The Utah Hamfest Committee has published a schedule of events for the hamfest this summer please check out the Web site and see what activities you will want to attend and register early. Plan now to attend Utah Hamfest 2001 in July 13-15 at Rubys Inn, for hotel or campsite reservations also see the Web site at http:\\www.utahhamfest.org. 73 de Mel, AC7CP.

WYOMING: SM, Bob Williams, N7LKH—Public Service continues to be the name of the game for retaining our amateur frequencies. This is reflected by our participation in ARES, RACES and NTS. Within the Section there some gaps in our support and some thin spots because of the low population numbers. In December Marty Luna, WA7MA, became Section Emergency Coordinator and hence head of ARES for the Section. More recently, Jim McKeithen, AC7KF, has become the new state RACES Officer, replacing Scott Harris. Jim also works for WEMA in communications in Cheyenne. Between the two of them and the rest of us we will get the gaps filled before long. There will be some arrangements for training sessions for those who want them and mail order alternatives for those who do not. Meanwhile there will be practice session opportunities for us, providing communications for the March of Dimes in April and the Tour de Wyoming in July. This year the Tour goes from Gillette to Wright to Newcastle to Sundance and back to Gillette between 22 and 30 July. Coverage will be a challenge. Tfc: NN7H 236.

SOUTHEASTERN DIVISION

ALABAMA: SM, Bill Cleveland, KR4TZ—ASMs: W4XI, WB4GM, KB4KOY. SEC: W4NTI. STM: AC4CS. BM: KA4ZXL. OOC: WB4GM. SGL: KU4PY. ACC: KV4CX. TC: W4OZK. PIC: KA4MGE. Hamfest season in Alabama is hitting full swing, and this month we have hamfests in both Albertville and Moulton, AL. I really enjoy attending hamfests. I get to meet face-to-face with my friends from the radio waves, and look at some interesting stuff. Amateur Radio would not survive long without the hamfests! I hope to meet you there. If you would like to use CW, please check out the Alabama Training Net on 3714 kHz daily at 6:00 PM and the Alabama Section Net on 3575 kHz daily at 7:00 PM and again at 10:00 PM. CW is alive and well in Alabama, and I hope you will take advantage of our CW nets. On April 14 the Marshall County ARC will have its Sand Mountain Hamfest at the Albertville Recreational Center in Albertville, AL. The hamfest opens its doors at 8:00 AM and admission is $6.00. Talk-in is available on 147.20+. For more information check out the club's Web-site at www.qsl.net/mcarc-al or call Buddy Smith, KC4URL, at 256-593-2516. On April 28 the Bankhead ARC will have its hamfest at H. A. Alexander Park in Moulton, AL. Hours are 9:00 AM to 4:00 PM and admission is $3.00. Talk-in is available on 146.96. License exams will begin promptly at 9:15 AM. For more information check out the club's Web-site at www.n4idx.org or call Ed Weatherford, KS4B at 256-974-0436. There is always something going on in our section, so please check out our Web site at www.kr4tz.org/al-arrl for more up-to-date news and information. God Bless & 73, Bill Cleveland, KR4TZ.

GEORGIA: SM, Sandy Donahue, W4RU—ASM/South Ga: Marshall Thigpen, W4IS. ASM/Legal: Jim Altman, W4UCK. Asst SM/IT: Mike Boatright, KO4WX, SEC: Lowry Rouse, KM4Z. STM: Jim Hanna, AF4NS. SGL: Charles Griffin, WB4UVW. BM: Eddie Kosobucki, K4JNL. ACC: Susan Swiderski, AF4FO. OOC: Mike Swiderski, K4HBI. TC: Fred Runkle, K4KAZ. PIC: Matt Cook, KG4CAA. Web site www.qsl.net/arrl-ga. The Calhoun hamfest sponsored by the Cherokee Capitol ARC is April 28. The Southeastern VHF Society annual conference is in Nashville, TN, April 20-21. Check the section Web site for more details. Albany ARC has a new club station at the Albany Red Cross. Albany also has

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a tailgate and swapmeet on June 9. Alford ARC in Stone Mountain is celebrating their finally acquiring 501 (c)(3) nonprofit status. Kennehoochee ARC new officers: Chairman KF4TCR, Vice-chair KG4DPF, Sec. KC6ETU, Tres N4TZN. Gwinnett ARS Techfest was a tremendous success with the room crowded with old hams, new hams and not yet hams. A great concept and along with a variety of chili, a gastronomic delight. ARRL staffer Brennan Price, N4QX, will attend the Atlanta hamfest June 2. He will speak about regulatory and interference matters and check DX cards.73 Sandy. Tfc Jan: WB4GGS 213, W4WXA 120, AF4NS 119, KF4FXG, 76, K1FP 54, W4AET 31, K4WKT 22, WU4C 21, K4BEH 20, KA4HHE 16, K4BAI 5, AF4PX 1.

NORTHERN FLORIDA: SM, Rudy Hubbard, WA4PUP—Congratulations to Cindy Radice, KD4NLV, for accepting the position of Official Observer Coordinator for the Northern Florida Section. Cindy has held responsible positions in the past with the Orlando Radio Club and with the Orlando HamCation. Frank is taking a deserved rest and will be doing some traveling. Frank has done an outstanding job making the OO program a real effective one in the Northern Florida Section. He established a very close working relationship with Riley Hollingsworth, of the FCC, which is very much appreciated. Robert Forrester, KB4USW, was issued a Certificate of Merit for his outstanding role as Official Observer. Bob has been involved with the OO Program since the beginning, but due to ill health is having to back off some of his activities. The OOC will be looking for people interested in OO positions in the major cities of the Section. Anyone interested should contact Cindy. Congratulations to Dave Flagg, N4BGH, accepting the DEC responsibilities for the E Central District. Dave first received his license in Georgia, and was very active in the Newnan Radio Club. Upon establishing residence in Florida became active in the local area, and in the emergency operations of the District. Bernie, NP2CB held the DEC position for several years, and did an outstanding job of providing the leadership to the ECs of the District. Rick Palm provided interim leadership after Bernie, which was appreciated. Rick is a person that can fill in at any time on short notice. Each Staff member is interested in discussing the programs with anyone desiring to accept responsibility. Amateur radio is a fun thing, and the more you get involved the more fun you will have. At this writing, I am preparing to speak at the Orlando Radio Club, and the Orlando HamCation ARRL Forum. Next month will include the activity of the Orlando HamCation, and the following month will be the Fort Walton Beach Hamfest activities. 73 de Rudy. Tfc: WX4H 1029, KE4DNO 254, AD4GL 200, NR2F 149, KB2EV 144, AF4PU 113, K1JPG 108, KG4EZQ 65, K8KV 59, WB2FGL 57, N9MN 50, KF4WIJ 49, KB4DXN 43, AB4PG 40, K4JTD 32, KM4WC 22, KB3DCR 20, N4JAQ 18, KC4FL 17, WA1VOP 16, W8IM 11, K4JHS 9, K4KIX 7, WA4EYU 6, WD4ILF 4, WB9GIU 4, W4ZET 3, WX4J 2.

PUERTO RICO: SM, Víctor Madera, KP4PQ - Las clases para principiantes en Boquerón y en San Juan siguen adelante. Necesitamos voluntarios para comenzar programas en otros pueblos de la isla. Solo se requieren dos horas a la semana. El programa de capacitación para "Amateur Auxiliary" está programado para febrero. Socios activos del ARRL cualifican para estos seminarios que se ofrecerán en español. Se están haciendo arreglos para la celebración del "GOTA" ("Girls on the Air") una actividad similar al JOTA de los Niños Escuchas. Se reunirán más de 400 Niñas Escuchas en las facilidades del Complejo Roberto Clemente en Carolina, P.R y tendrán la oportunidad de comunicar con niñas alrededor del mundo vía ham-radio. Dentro del programa del ARRL/VEC para el año 2001 ya se celebraron con éxito sesiones de exámenes en Arecibo, Aguadilla y San Germán. La próxima sesión será en Ponce. Las reuniones del PRDX Club se celebran los segundos lunes de cada mes en la UPR de Río Piedras. Todos están invitados a disfrutar de videos relacionados con expediciones famosas y otros temas relacionados con el DX. El curso de "OOs" está próximo a comenzar. Interesados comuníquense con el Section Manager por correo regular, teléfono o vía email a kp4pq@arrl.org.

SOUTHERN FLORIDA: SM, Phyllisan West, KA4FZI—SEC: W4SS. STM: KJ4N. ACC: WA4AW. PIC: W4STB. OOC: K4GP. BM: KC4ZHF. SGL: KC4N. DEC/ASM: N4LEM, WB9SHT, AA4BN, KD4GR, WB2WPA. Web Page http://www.sflarrl.org. Thanks to Dade, Ft Myers, Hollywood, Indian River, Orlando, South Brevard, Vero Beach, Wellington Clubs, and ECs for the newsletters and activity information. It is with sincere regret that I write of the retirement (at the end of this term) of our Miss Evelyn Gauzens, W4WYR, Vice Director of the Southeastern Division. Always available with an understanding ear, open mind, and willingness to help, she will be greatly missed at HQ and in the division. The South Brevard ARC assisted the Space Coast Runners Club in the Harold Tucker K4HXW, Memorial 50 K race. Harold was a member of the Runners Club and became a Silent Key in December. Kudos to eight flexible hams who worked runners around dredges doing sand replenishment on the beach. The Broward ARES/RACES team is planning a SET that will be coming up soon. Congratulations to Evelyn Gauzens, W4WYR, Miami Hamboree chairman, and to Dade Radio Club of Miami for a blazing success on Feb 3 and 4. The new building was spacious, well laid out, and I didn't see an empty table. The SFL section workshop was the largest ever. Kay Craigie, ARRL VP, honored us with an insider's view of "The Big Project" and Steve Ewald joined us at the 50-foot welcome booth, which was a flurry of activity both days. Congratulations to Rick Adamson, KC4ZHL, for receiving the Ham of the Year Award from the Hollywood ARC. They have purchased a new antenna for the HARC repeater, which has been worked on and is sounding better already. The Indian River ARC's Roy Hill, W6QCM, reported on their terrorist drill. The premise was: a cruise liner was sunk in the Port Canaveral channel by an internal bomb, blocking the channel. With normal communication channels disabled, hams came to the rescue. Read the details in the Section News on our Web page. Fantastic job, Indian River. Congratulations to the new Vero Beach RACES Officer, Jeff KF4PKB. Lee County enjoyed an excellent turnout at their hamfest this year. West Palm EC, N4QPM, reports that their ARES group has obtained 501-C3 status and has received one donation already. They will provide communications for the FAU Wellness 5K run. Seventeen members assisted in the "Run for the Cure" with 17,300 runners. Way to go, WP. Wellington ARC is hosting another popular radio clinic for HT's and base radios. Tfc by STM, KJ4N: WA9VND 539, KB4WBY 288, KA4FZI 278, KC4ZHF 174, KD4GR 152, KJ4N 148, KD4HGU 109, K4FQU 85, K4VMC (club) 67, WA4EIC 63, W8SZU 62, WB4PAM 56, KD4JMV 54, AA4BN 48, KE4WBI 41, WA4CSQ 39, KE4UOF 30, KT4XK 27, KG4CHW 21, W4WYR 13, AF4NR 9, W3JI 7, W6VIF 4.

VIRGIN ISLANDS: SM, John Ellis, NP2B, St Croix—ASM: Drew, NP2E, St Thomas. ASM: Mal, NP2L, St John. Internet Mgr (SIM): Jeanette, NP2C, St Croix. SEC: Duane, NP2CY, St Thomas. PIC: Lou, KV4JC, St Croix. ACC: Debbie, NP2DJ, St Thomas, NM: Bob, VP2VI/W0DX Tortola. Team RITTY in St Thomas (Drew NP2E, Bernie NP2Y, Debbie NP2DJ, Ron KP2N, et al.) getting primed up for the WPX RTTY contest coming up this weekend. Good luck, guys. NP2C is re-doing the VI section Internet Website, this time with audio! By the time you read this, the new Website will have been up for some time. Take a look! www.viaccess.net/~jellis. Tnx to Mike, KO4WX, Webmeister for GA section for good ideas - nice site Mike (www.qsl.net/arrl-ga). St Croix ARC getting fired up again with quarterly meetings on 2nd Saturday at the beginning of each quarter. Check Website or 147.25 machine for additional info as to time and place. Local repeaters 146.63, St John, 146.81, St Thomas & 147.25 St Croix. e-mail to SM, np2b@atthehelm.com 73, John, NP2B.

WEST CENTRAL FLORIDA: SM, Dave Armbrust, AE4MR, ae4mr@arrl.org, http://www.wcfarrl.org—ASM: NA4AR. ASM: Web N4PK. ASM: Legal, K4LAW. SEC: KD4E. TC: KT4WX. BM: KE4WU. STM: AB4XK. SGL: KC4N. ACC: AC4MK. PIC: AB2V. Please welcome Dan Hawthorne, AI4ET, as the new EC for Pinellas County. The Executive Committee has approved the Tampa Bay Hamfest as this year's SE Division Convention. It will be December 1st and 2nd. The MS-150 will be April 21st and 22nd. Several APRS trackers will be used in this event. Several new nets are planned for the K4WCF repeater system. Frequencies are 145.430- MHz and 442.950+ MHz both with a 100Hz tone. Some significant changes have been made to the Section's Web page at http://www.wcfarrl.org January:

Net/NM	*QNI*	*QTC*	*Bulls*	*QND*	*Sess*
AIN/WA4ATF	58	4	8	103	4
PINN ARES/WB2LEZ	140	4	13	294	10
POLK ARES/KE4VBA	69	0	2	94	5
SPARC/KF4FCW	392	35	0	694	31
TURTLE/KT4TD	370	73	0	472	31
FMSN/KT4PM	337	42	0	502	31
TPTN/AD4IH	748	104	0	492	31
QFNS/KF4KSN	190	43	0	610	31
QFN/AB4XK	979	315	0	1,085	62

PSHR: K4SCL 147, KT4PM 141, K4RBR 139, AB4XK 137, AD4IH 134, KF4KSN 106, WB2LEZ 103, W4AUN 98, KE4VBA 83, KT4TD 82. Tfc: K4SCL 195, AB4XK 183, AD4IH 87, KT4PM 45, KF4KSN 35, KT4TD 29, K4RBR 27, KE4VBA 21, W4AUN 15, WB2LEZ 9, AA4WJ 1. 73, Dave, AE4MR.

SOUTHWESTERN DIVISION

ARIZONA: SM, Clifford Hauser, KD6XH—By now you have heard of the ARRL dues increase. Yes, the ARRL board voted to increase dues to $39.00 for regular membership and $34.00 for seniors. This increase will take effect on 01 July 2001, so if you renew before this date you can get the old price. One of the many volunteer areas of amateur radio is SKYWARN. Steve Sipple, KB7QHP, is the Phoenix area SKYWARN coordinator and he is looking for Amateur Radio operators to help in this public service area. This is not limited to just Phoenix. Volunteers are needed throughout the state. So if you are interested in weather and would like to be a part of this area of public service, you can contact Steve at 602-275-7002 (ext. 537) or by e-mail at steve.sipple@noaa.gov. As a volunteer spotter you will receive the basic training and all information that will help you in observing and reporting certain weather types. Carl Hayden did a great job for Kid's Day with stations showing radio operation and Morse code. The stations were set up in such a way that each person was given hands-on operation. Great job, Allan Cameron, N7UJJ. The Green Valley ARC have supplied electronic kits to several local schools and are busy helping kits learn about Amateur Radio. I hope many will become licensed operators. Our 2-meter/440 repeater systems throughout this state are really good. Many clubs go to great lengths to operate and maintain their systems. If you are a regular user of a repeater system, I am sure the owner or club maintaining the system would appreciate a little financial help if you are not already helping. These systems cost many dollars and maintenance money is getting hard to come by. The next hamfest is the Arizona ARC DeVry swap meet on 7 April. This event will start at 0600 hours and is normally a good event. Please support all these events and your local Amateur Radio Club. In May, The Cochise ARA will hold their semi-annual swap meet on 5 May on the local site, Green Acres. The Arizona Web site is alive and doing well. Tom Fagan, WB7NXH, has developed this Web site for the Arizona section and is always providing new material and updating it every day. The address is www.qsl.net\arrlaz\. Next year the ARRL SW Convention will be in Riverside at the Holiday Inn. 73, Clifford Hauser, KD6XH. Net: ATEN 105 QNI, 20 QTC, 31 sess. Tfc: K7VVC 1082, W7EP 110.

LOS ANGELES: SM, Phineas J. Icenbice, Jr., W6BF – You don't need a lot of money or a good location to communicate with the World. Last month the W7DXX, remote base station, computer controlled via the Internet, was mentioned as one solution for those with difficult or nearly impossible locations. The following is proof that you don't need to spend lots money for you dream Ham station. In 1937, W9QUV, in Renolds, IL, was visited since he was very active on 160 & 10 meters and always had a good signal in Iowa. I was anxious to learn what a really great station looked like. After arriving at what I thought was the correct address, I found the beam antenna but the front door was boarded-up, so I walked around to the rear of the two- story house to look at the beam. The beam was mounted on a pipe that passed by an open window. A ladder nailed to the house was next to the pipe that turned the beam. The method of antenna rotation turned out to be the often quoted, "Armstrong-method of rotor power." After calling Ivan, are you home, a voice came out the open window. Climb up the ladder. I climbed the ladder and entered the window to find the complete second floor loaded with ham gear. It was difficult to identify the transmitter and receiver, but I found the 12" loudspeaker that was blasting away with familiar voices. My

YAESU

FT-1000D Transceiver

tx: 160–10m **rx**: 100kHz-30MHz • 200w • 100 mem. • Dual receive • Antenna tuner • Dual bandpass filter • Temp. compensated crystal oscillator • 2.4kHz & 2kHz SSB filters, 500Hz CW crystal filter 6"h x 16"w x 15"d, 58 lbs.....**Special** **© **$3599.99**

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HF & satellite • 100w HF/6m • 50w 2m/430 MHz • Crossband full duplex • Reg/reverse tracking • Satellite memory • DSP filters • Low noise VHF/UHF • Built-in preamp • Shuttle jog • CW sidetone pitch control • CTCSS/DCS enc/decode • Direct keypad entry • 1200/9600 bps **Spec** © **$1399.99**

FT-920 HF Transceiver

HF+ 6m • 100w • AF-DSP • Auto antenna tuner • 127 mem. • FET RF amp • Digital voice mem. • Dual display • Keyer • **FREE FM-1 unit for a Limited Time**..... **$1339.99**

Affordable Beginner's Radio!

FT-840 HF Transceiver

transmit: 160 to 10m, **receive:** 100kHz to 30MHz • 100 memories • 100 watts • Twin VFOs • Optional FM • Repeater offset • CTCSS encode • 13.8V DC @ 20A • 10"w x 3⅜"h x 9½"d,18 lbs..... **$699.99**

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Amateur coverage: 160–15 & 6m • 1000w • 220V AC 500w power out on 6m • Built-in high-speed ant. tnr • 2 RF inputs • 4 RF outputs • Auto band switching w/FT-1000D, FT-1000MP, FT-920 & FT-900 • Separate amp & PS units • 16¼" x 5¾" x 16¼" • (amp) 33 lbs; (pwr sply) 26 lbs..... **$3999.99**

FT-100 Mini HF Transceiver

160-6m mobile xcvr + 2m and 430-450MHz rx: 100kHz-30MHz, 30-970MHz (cell blocked) • 100/50/20w • DSP • SSB/CW/AM/FM/AFSK/Packet oper. • Built-in CTCSS/DCS • 300 memories • IF Shift • IF noise blanker • VOX • Dual VFOs • Electronic mem. keyer • Speech processor.....**Final Closeout** *© **$899.99**

FT-100D Same as FT-100 with 500Hz, 8-pole crystal filter • High stability reference oscillator • FTS-27 CTCSS decoder • High quality speaker .....**Special** **© **$999.99**

FT-90R Micro 2M/440 Transceiver

50/35w 2m/440 micro FM • Built-in CTCSS/DCS enc/dec • Select. TX power • 186 mem. • Direct keypad freq. entry • DTMF • ADMS PC program. • Auto repeater shift • RF-lavel squelch • Program. front panel/mic key func. • 3.9"w x 1.2"h x 5.4"d.....**Special** **$369.99**

NEW!

FT-7100M Dualband Mobile

144-148, 430-450MHz tx; 108-137MHz (AM), 137-180MHz, 320-480MHz, 810-999.99MHz (cell blocked) rx • Dual receive • Selectable channel steps • 50W (144MHz), 35W (430MHz) • 262 memories • Alphanumeric • SmartSearch™ • CTCSS/DCS enc/decode • ARTS™ • Band, band-limit, mem. scanning • RF squelch • 5.8"w x 1.9"h x 6.9"d **$449.99**

FT-8100R Dual Band Transceiver

2m 144–148MHz tx, 110–550 & 750-1300 MHz (cell blkd) rx • **70cm** 430–450MHz tx/rx • 208 mem. • 50-35/3/5w • CTCCSS encode • 5½"w x 1½"h x 6¼"d..... **Special** **$399.99**

FT-2600M 2m FM Transceiver

60w • 134-174MHz rcvr • 175 mem. • Built-in CTCSS/DCS enc/dec • Smart Search™ • Auto repeater shift • S-Meter squelch • Extensive menu • Key freq. entry from mic • 1200/9600 bps packet • Compact..... **$229.99**

FT-1500M 2m FM Mobile

144-148MHz tx/137-174MHz rx • 50w • 1200/9600bps packet compatible • CTCSS enc/decode • 130 mem. • 10 weather channels • Windows programm .....**Special** **$199.99**

NEW!

FT-817 Backpack Transceiver

HF/VHF/UHF • 160-10M, 50MHz, 144MHz, 430-450MHz, Alaska emergency tx • 100kHz-56MHz, 76-154MHz, 420-470MHz rx • 5/2.5/1.5/0.7w power output • DSP • USB/LSB/CW/AM/FM/W-FM/AFSK/Packet/RTTY • Built-in CTCSS/DCS • 200 mem. • IF shift • Built-in noise blanker • VOX • Dual VFOs • Spectrum scope • SmartSearch™ auto load • ARTS • Auto repeater shift • Built-in CW keyer • 5.31"w x 1.5"h x 6.5"d **$769.99**

FT-3000M 2m FM Transceiver

70w • 110 to 180MHz, 300 to 520, 800 to 999MHz receive (cell blocked) • 81 memories • 1200/9600b comp. • 5½"w x 1⅜" x 6¼"d, 2¼ lbs.....**Special** **$399.99**

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*© Coupon good until stock is gone

Antenna Rotators

Light, medium, heavy & extra heavy-duty models, plus elevation & azimuth – elevation.

G-450A Lt/medium, 10 sq. ft **$259.99**
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G-800SA Medium, 17 sq. ft **339.99**
G-800DXA Same, w/presets..... **429.99**
G-1000DXA 23 sq. ft. w/presets **519.99**
G-2800SDX. Extra HD, 23 sq. ft .**c/o** **1049.99**
G-2800DXA Extra HD, 23 sq. ft **1139.99**
G-5500 Azimuth/elevation 11 sq ft ... **629.99**

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FT-411MKII/12 5w 2m HT..... **179.99**
VR-120 100k-1300MHz AM/FM rcvr. **199.99**
VR-500 100kHz-1300MHz AM/FM/SSB handheld receiver **299.99**
VX-150 5w 2m FM HT..... **149.99**
VX-1R 500mw 2m/440 HT **159.99**
EDC-15 DC adapt.; VX-1R/FRS**Special** **19.99**
VX-5R 5w 6m/2m/440 HT....**Special** **319.99**
VXA-100-16/41B 5w air HT w/VOR.. **499.99**
VXA-120 4w air HT..... **299.99**

NEW!

VR-5000 Scanning Receiver

100kHz-2.6GHz (cell blocked) contin., multimode • 2000 mem. channels, 100 banks • Dual receive • SmartSearch™ auto mem. load • Direct keypad freq. entry • World clock • 7.1"w x 2.75"h x 8"d **$899.99**

FRG-100B Receiver

50kHz-30MHz, SSB/CW/AM modes • 50 mem. • Selectable bandwidths • Dual ant. inputs • 9¼"w x 3⅜"h x 9⅝"d .**Spec** **$569.99**

first question was where is your microphone Ivan? He paused and said, "How does my audio sound?" I had been looking at "Turner" microphones in Cedar Rapids, IA, and was very curious about audio quality. I told Ivan that his audio was excellent. I said but where is your microphone? Ivan said you are looking and listening to it. It is the 12" loudspeaker. He then told me that he had tried not to spend more than $10 for his ham radio station. Sometimes looks can be deceiving. His audio quality was very unique. Ivan was very resourceful and his job, I found out later, was selling groceries to the farmers in western Illinois from an old truck. He closed the grocery store because it interfered with Ham Radio. By the way Ivan's last name was "Turner." Art Bell, W6OBB, can you top this TRUE Ham story? – The new e-mail QSL-system is a very interesting concept. My opinion is that some day a low cost QSL confirmation system like this first one (www.eQSL.cc) will be accepted, at least on a limited or modified basis. These Internet systems are very fast and cost effective for confirmation of contacts. I have been using the system since February 7, 2001. It works! de, W6BF, Phineas.

ORANGE: SM, Joe Brown, W6UBQ—A meeting was called to order by SM Joe, W6UBQ at 8:40 AM. Staff reports follow. SGL WU6I reported on his involvement with the California ACS system. SEC Ted, N6RPG discussed EC reactions to the present California power crisis. He noted the ARRL Emergency Communications Course and Director WA6WZO indicated that it would appear proper to charge the course cost to the section expenses. Ted will work on getting the section to participate. TC Art, KQ6HF, reported on recruitment of TSs. As Webmaster, he reported the Web site has about 86 hits per month with a total of 1054 hits to date. ASM W6XD noted Radio Shack has RFI-proof telephones. W6XD also noted ARRL will increase membership dues in July, but is offering a 5-year rate until that time. Regular membeship for 5 years is $146, and for senior members the 5-year rate is $122. Fred, W6TKV, prepared a certificate for W6UBQ recognizing his most unique action of becoming Chief RACES officer in Riverside Coutny. All attending the meeting signed. Dir WA56WZO noted current management restructuring with ARRL. K1ZZ will have have increased responsibilites with the Chief Financial Officer reporting to him. There is also a review of the Field Organization with goal of updating with today's needs. Also noted that Field Day rules are being amended to reflect added capability of originating messages rather than just relaying them. ACC WA6WZN advised that clubs can renew their SSC and affiliated club status on the Web at arrl.org/acc.html and arrl.org/club/index.html. There are no notices of expiration. Each club has to check themselves. There are 241 clubs in the Southwest Division. ASM WB9MJQ gave a report that he will write letters to new hams when he gets mailing labels. OOC KC6PFS has updated their data base. SM W6UBQ opened discussion on the PSHR program and the need for HF band ajustments to accommodate the new digital systems. The meeting adjourned at 9:40 AM

SAN DIEGO: SM, Tuck Miller, NZ6T, 619-475-7333— It is now OFFICIAL! The 2002 Southwestern Division will be held at the California Center for the Arts, Escondido. The dates are scheduled for August 16-18th. There are about 4 hotels in the approximate area, and one good, I mean great thing, is that there is 1500 FREE parking spaces. The Town and Country wanted to charge us $12 per day to park, and hotel rates over $125 per night. YIKES!! Convention chairman John Hudson is looking for volunteers, and he is looking for some since yesterday. If you can help him out, please contact me. There are a lot of positions open, and you can help by joining the team. Thanks to George, KO6BU, for helping out with the negotiations. He got us a great deal. The International DX convention is this month once again in Visalia. If you have never been to one of these conventions, you are really missing out. Some of the biggest names in the DX world are usually in attendance (what in the world am I doing there), and it is a great deal of fun. Coming up in September is the 2001 convention, and it will be held in Riverside. Hope to see many of you there. Not sure who will all be there as of yet, but you can bet it will be a great convention. Aren't they all? If it pertains to ham radio, it's got to be good. Congrats to John Markham, KD6VKW, for being honored as the Ham of the Year for the South Bay Amateur Radio Society. Thanks go to George Roos, KO6BU, for his years of service as chair for the San Diego Amateur Radio Council. He will be a hard man to replace. Ever tried to find a hidden transmitter? You can get a chance twice a month if you like. On the 1st and the 3rd Sat evenings of each month at 6pm. Starting point is at the SE corner of the Grossmont College parking lot. Congrats to the Palomar Amateur Radio Club on celebrating 65 years as a club. That is certainly a great achievement. Sign up for the members only Web site for the League, and get a weekly newsletter from the SM. Traffic: KT6A 727, KD6YJB 81, KF6YVQ 22, KO6BU 2, WA6IIK 1 BPL KT6A 727 PSHR: KT6A 138 KD6YJB 34 KO6BU 43 Until next month... Remember, Helping Others.....Always Worthwhile!! 73, Tuck, NZ6T.

SANTA BARBARA: SM, Robert Griffin, K6YR, (k6yr@arrl.org or k6yr@arrl.net)—SEC: Jack Hunter, KD6HHG (kd6hhg@arrl.net). STM: Ed Shaw, KF6SHU (kf6shu@arrl.net). SGL: Paul Lonnquist, NS6V (paul@dock.net). ACC: Michael Atmore, KE6DKU (ke6dku@aol.com). OOC: Howard Coleman, N6VDV (N6VDV@arrl.net). PIC: Jeff Reinhardt, AA6JR (jreinh@ix.netcom.com). TC: Warren Glenn, KM6RZ (wglennrz@ix,netcom.com). ASMs: Ventura, Don Milbury, W6YN (w6yn@arrl.net). San Luis Obisipo, Bill Palmerston, K6BWJ, (bpalmers@fix.net) & for Internet, Jack Bankson, AD6AD (ad6ad@arrl.net); & DECs: Santa Barb-Dave Lamb, WA6BRW (wa6brw@arrl.net); SLO-Bill Peirce, KE6FKS (ke6fks@arrl.net) & Ven-Dave Gilmore, AA6VH (aa6vh@arrl.net).Need timely ham radio education news? Try ARRL's new interactive Web versions of "Amateur Radio in the Classroom and Educational Activities Forum." To read them and go interactive, click on http://www.arrl.org/FandES/newsletters/. Print copies are still available from ARRL Field & Ed Services Dept. w/SASE. FREE instant Section news updates? Join the SB Reflector! E-mail majordomo@qth.net the message subscribe arrlsb. SB Sec Web: www.qsl.net/arrlsb/. Join in our Section NTS traffic nets: SCN slow speed NTS Net, M-F, at 1915 local on 3598 kHz & SCN/SB at 2100 local on 147.000+(131.8), 224.90- (131.8) & 449.300-(131.8). Thats 30! Rob, K6YR, SM.

WEST GULF DIVISION

NORTH TEXAS: SM, Don Mathis, KB5YAM—STM: KC5OZT. BM: KC5OZT. SEC: K5MWC. SGL: N5GAR. OOC: WB5UDA. ACC: WN5PFI. ASMs: KX5K, K5RE, KK5QA, KK5NA, N5JZ, KB5LWZ, N5JL, KD5HIS, AD5X, W5GPO. I would like to take this last issue to thank again the efforts of the many within the section that have supported me during this last term. After the many visits to clubs and hamfests during this term, I am more than ever convinced that they are the glue that holds all of us together. Join your local club(s) and support them. I have made many friends during these meetings and hope to see you all again in the future. I would like to thank the effort of all hams that contribute their time, money, and efforts to the community public service activities including SKYWARN, mall watches, walks, emergency communications during weather related times, and all other emergency support efforts. I believe that this area is very important to us keeping our frequencies. Special thanks to all that simply move off a repeater or frequency to let those communications go on without interference. Join your local ARES or RACES organization and help support them in a formal manner. The leaders of those organizations have spent a lot of time setting up the organization. Know your local EC and support them. I would like to thank the efforts of all of my staff, especially KC5OZT, WN5PFI, N5GAR, K5MWC, KD5HIS, AD5X, N5JL. Their support was much appreciated and needed. I would like to thank the efforts of the ARRL headquarters staff for their support. Thanks to Coy Day and Jim Haynie for their efforts and support. I am convinced more than ever that without ARRL we would have nothing. I would like to give special thanks to my friend, N5JZ. Jim spent many hours and miles supporting me and ALL ham activities. We can never repay all that he has done for us. In summary, there was much that was accomplished during my term because of the efforts of many people. I have enjoyed it and have learned a lot. There is much that I would do different if I had to do over. Larry, there is still much yet to do and I will support you all that I can. The section is in good hands. January SAR: KC5OZT 376, N5JZ 296, K5NHJ 141, W5AYX 121, KB5TCH 70, WA5I 29, AC5Z 10, K5TEK 6, AC5UZ 2, N8QVT 1, KB5YAM 0. BPL N5JZ 113 orig/deliveries. 73, Don, KB5YAM.

OKLAHOMA: SM, Charlie Calhoun, K5TTT—ASMs: N6CL, W6CL, W5ZTN, AB5JY. SEC: KA7GLA. ACC: KB5BOB. PIC: WA9AFM. OOC: WB9VMY. SGL: W5NZS. STM: K5KXL. The Tulsa Green Country Hamfest was a big success. They were back at the convention center this year and had a good turnout. There was good attendance at the ARRL and ARES forums. John and Callen are doing a great job with reorganizing ARES in Oklahoma. Be sure to check into the state ARES training net on Sundays at 15:00CST on 3.900. You can also subscribe to the section email list to keep in touch with what is going on in the state. See the section web site for details. One thing I did mention at the ARRL forum is that I'm looking for someone to help me maintain the section Web site. If you are interested please let me know. The stormy season is almost upon us. I would urge you to seek out and attend a weather seminar in your area before going out weather spotting. The National Weather Service provides great training opportunities throughout the state. I have assembled a calendar on the section Web site with dates and places of weather seminars for this year. Check it out. That's it for this month. 73, Charlie. Tfc: WA5OUIV 399, KF5A 432, KK5GY 311, WB5NKC 229, WB5NKD146, WA5IMO 125, KE5JE 179, K5KXL 150, KM5VA 95, KI5LQ 91, W5REC 26, N5FM 3.

SOUTH TEXAS: SM, Ray Taylor N5NAV— ASMs: KS5V, N5WSW, W5GKH, K5DG, N5LYG, WA5UZB, KK5CA, K5EJL, W5ZX, WA5TUM, KB5AWM, WA5JYK, K5PFE, K5PNV, and K5SBU. STM: W5GKH. SEC: W5ZX. ACC: N5WSW. TC: KJ5YN. BM: W5KLV. OOC: W5JAM. SGL: K5PNV. HB-1148 was no April Fools joke. For you that have been asking if ARRL was going to get involved fighting, they were on top of it almost before the ink was dry. It truly violates State and Federal laws, concerning ham towers, and mobile operation, as it was written. I got a copy of HB-1148 in the hands of Larry Eblin, who spoke to the Austin Society of Broadcast Engineers, on February 8th. They were strongly against this bill. They were hoping the hams would voice their thoughts to Rep. Cook. So we have lots of outside help on defeating this bill. We are now into Hurricane season. Hope you join us in the Texas ARES Net on Monday night at 7:30 on 3873. Hopefully we wouldn't have to withstand any damage. Several agencies have become aware of the service that ham radio supplies free, when disaster strikes. The ice storm in December and January sure brought that to their attention. We had a great turn out for the San Antonio Ham Fest. It was great to see Coy Day and his wife there. Coy always brings a big smile to the hamfests he attends. By the time you read this, Smithville will be history. I'm sure we will have a great time as always. I haven't heard too many comments on DX, but it has been good on 20, 17, and 15 meters lately. Now as to the increase in ARRL membership. It takes money to fight things like HB-1148, our frequency spectrum, and etc. If it were not for ARRL we wouldn't have any rights left as Amateur Radio operators. They stay on top of everything that concerns us. You don't find any other organization doing the job they do. If all the hams in the U. S. would join then a few wouldn't have to carry the load. It seems that is happening in several organizations. A few have to carry the load, but all want to reap the benefits. Some have already noticed, I just thought I would mention, Ed has changed his call back to the original, KS5V. Good to have you back to normal. Keep up the good work, Ed. KD5GM reported the a new club is being formed in Pasadena, TX. Pasadena Amateur Radio Club meets in the police station, with their main interest in emergency communication. I hope you much success. Please consider ARRL club affiliation. I'm sure you will enjoy the benefits. Have a good April. Tfc: W5SEG 1189, W5TUK 192, W5KLV 146, N5OUJ 143, N5NAV 133, K0YNW 120, W5ZX 73, W5GKH 55, KD5GM 14.

WEST TEXAS: SM, Clay Emert, K5TRW— WAE Contest, (first certificate issued 1936), results announced. 1st Jack K5JEH, 2nd Jean K0ZRD, 3rd Guus, KK5TU, DX K5JEH, States WD5FVQ, Ambassador KB5BDY, QCWA K0ZRD, YL K0ZRD. Six WAT certificates KB5GZZ, KA5ZLX, N2OYV, WB8LZB, WA5VEE, WA2ZOU. The annual banquet at Big Bend ARC in Alpine had Coy Day, N5OK, as speaker, a big success with 35 present. N5DO, Dave Cockrum, selected as Ham of the Year/Millennium. El Paso's Joe Barns, K5FZH, now SK. From AE5B, the news is that W5AWT, Mel Boatman, of Monahans is also SK. 73, Clay.

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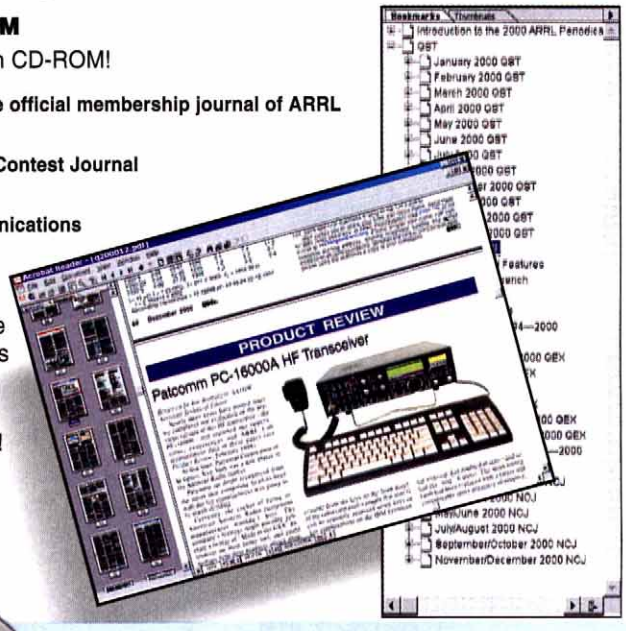

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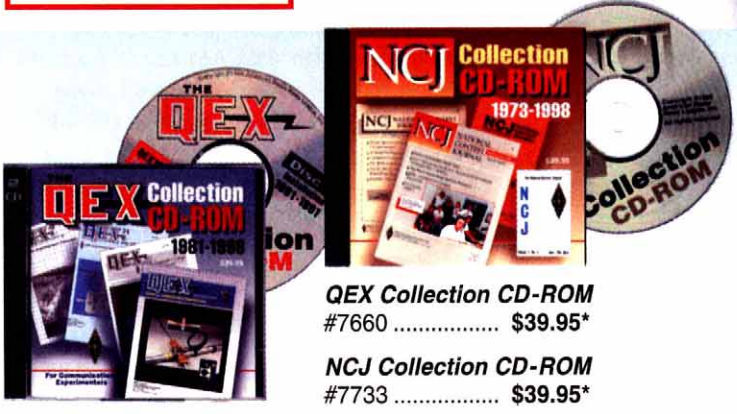

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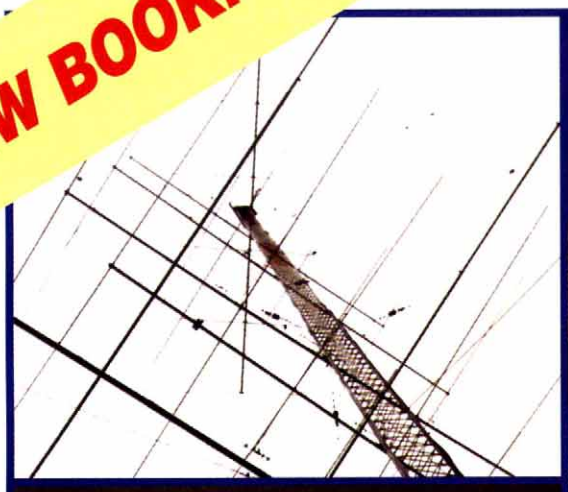

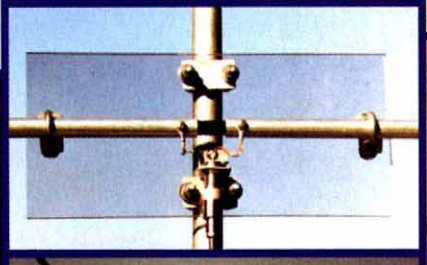

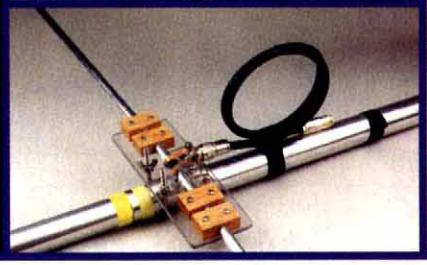

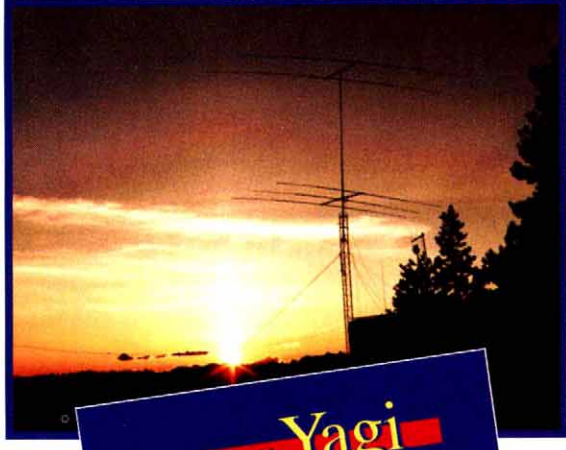

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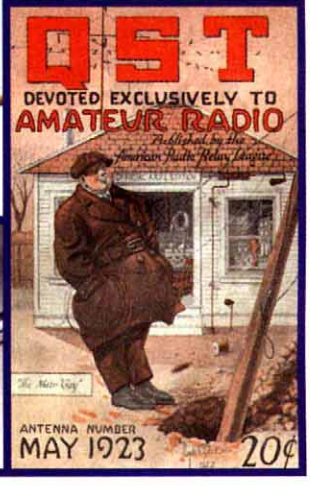

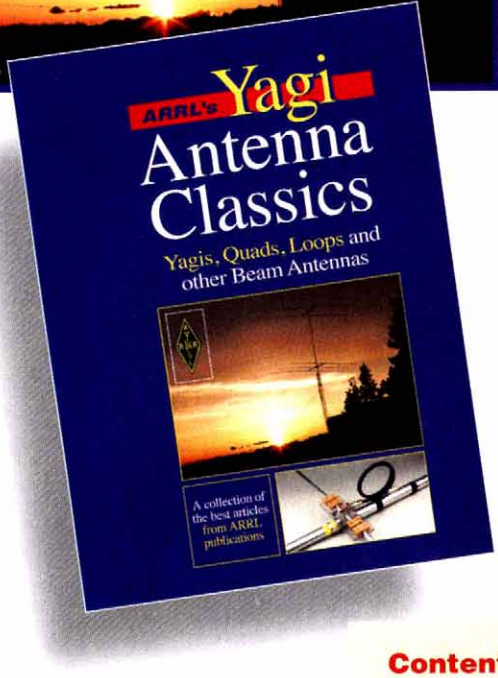

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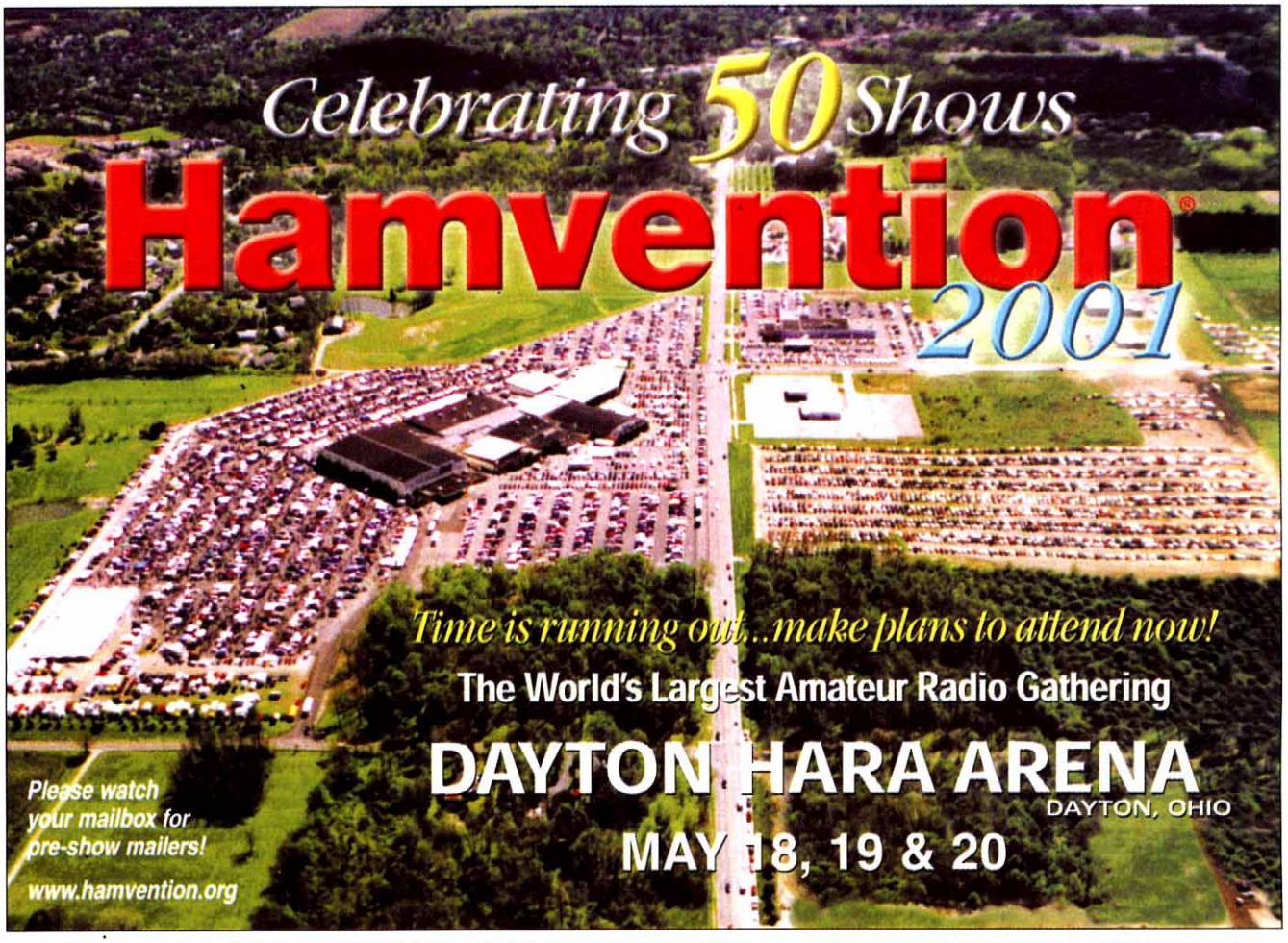

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LMR 600 (OD.590") SOLID CCA CNTR FOIL + BRAID 1.72dB @ 450 MHz WP/UV JK T	1.27/FT	1.25/FT	1.23/FT
LDF4-50A Andrew 1/2" Heliax® 1.51 db/1530 watts @450 MHz 450 MHz	2.38/FT	2.33/FT	2.25/FT

COAX (50 OHM "HF" GROUP)

	100FT/UP	500FT	1000FT
RG213/U STRD BC MIL-SPEC NC/DB/UV JACKET 1.2 dB/2500WATTS @ 30MHz	.40/FT	.38/FT	.36/FT
RG8/U STRD BC FOAM 95% BRAID UV RESISTANT JKT 0.9dB/1350WATTS @ 30MHz	.34/FT	.32/FT	.30/FT
RG8 MINI(X)95% BRAID UV RESISTANT JACKET 2.0dB/875 WATTS @ 30MHz	.18/FT	.16/FT	.14/FT
RG58/U 95% BRAID UV RESISTANT JACKET 2.5dB/400 WATTS@ 30MHz	.18/FT	.16/FT	.14/FT
RG58A/U STRD CENTER 95% TC BRD UV RESISTANT JKT 2.6dB/350 WATTS @ 30MHz	.19/FT	.17/FT	.15/FT
RG214/U STRD SC 2 95% BRD NC/DB/UV JKT 1.2dB/1800WATTS @ 30MHz	.25FT/UP	1.75/FT.	
RG142/U SOLID SCCS 2-95% SILVER BRAIDS *Teflon®* JKT 8.2dB/1100WATTS @ 400MHz	.25FT/UP	1.50/FT.	

COAX (75 OHM GROUP)

	100FT/UP	500FT	1000FT
RG11/U STRD BC (VP-66%) 95% BRAID NC/DB/UV JKT 1.3dB/1000WATTS	.44/FT	.42/FT	.40/FT
RG6/U CATV FOAM 18GA CW FOIL + 60% ALUM BRAID	.20/FT	.13/FT	.11/FT
RG6/U CATV FOAM 18GA CW FOIL *QUAD SHIELD*	.25/FT	.18/FT	.16/FT

ROTOR & CONTROL CABLES

	100FT/UP	500FT	1000FT
5971 8/COND (2/18 6/22) BLK UV RES JKT. Recommended up to 125ft	.22/FT	.20/FT	.18/FT
1618 8/COND (2/16 6/18) BLK UV RES JKT. Recommended up to 200ft	.37/FT	.36/FT	.34/FT
1418 8/COND (2/14 6/18) BLK UV RES JKT. Recommended up to 300ft	.49/FT	.47/FT	.45/FT
1216 8/COND (2/12 6/16) BLK UV RES JKT. Recommended up to 500ft	.80/FT	.76/FT	.72/FT
1806 18GA STRD 6/COND PVC JACKET Recommended for Yaesu Rotors	.25/FT	.23/FT	.21/FT

ANTENNA WIRE (Uninsulated)

	100FT	300FT	500FT	1000FT
14GA 7 STRD *"HARD DRAWN" (perfect for permanent Dipoles etc.)*	15.00ea	36.00ea	40.00ea	60.00ea
14GA SOLID *"COPPERWELD" (for long spans etc.)*	15.00ea	36.00ea	40.00ea	60.00ea
14GA SOLID *"SOFT DRAWN" (for ground radials etc.)*	15.00ea	36.00ea	40.00ea	60.00ea

ANTENNA & TOWER SUPPORT ROPE

	100FT	250FT	500FT	1000FT
3/32" DOUBLE BRAID *"POLYESTER"* 260# TEST WEATHERPROOF	7.50ea	15.00ea	22.50ea	40.00ea
1/8" DOUBLE BRAID *"POLYESTER"* 420# TEST WEATHERPROOF	10.00ea	20.00ea	35.00ea	57.00ea
3/16" DOUBLE BRAID *"POLYESTER"* 770# TEST WEATHERPROOF	15.00ea	30.00ea	50.00ea	80.00ea
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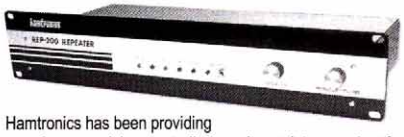

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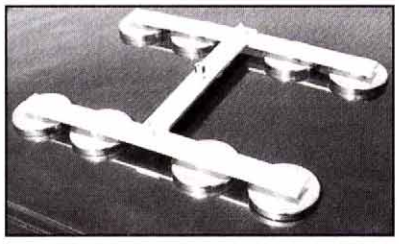

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0508G	1	170	28	15/0.7	Standard	367
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0550G	5-10	375	59	15/0.7	HPA	524
0552G	20-25	375	54	15/0.7	HPA	486
144 MHz						
1403G	1-5	10-50	6	15/0.7	LPA	163
1405G	1-2	100	14	15/0.7	Standard	295
1410G	5-10	160-200	28	15/0.7	Standard	328
1412G	25-45	160-200	22	15/0.7	Standard	286
1450G	5-10	350+	56	15/0.7	HPA	572
1452G	10-25	350+	52	15/0.7	HPA	525
220 MHz						
2203G	1-5	8-35	5	14/0.8	LPA	168
2210G	5-10	130	20	14/0.8	Standard	346
2212G	25-45	130	16	14/0.8	Standard	316
2250G	5-10	225	40	14/0.8	HPA	579
2252G	10-25	225	36	14/0.8	HPA	537
2254	75	225	32		HPA	494
440MHz						
4405G	1-5	15-50	9	12/1.2	LPA	309
4410G	10	100	19	12/1.2	Standard	367
4412G	15-30	100	19	12/1.2	Standard	355
4448G	1-5	75-100	25	12/1.2	HPA	429
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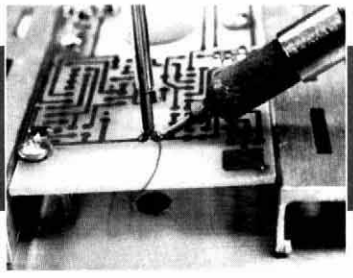

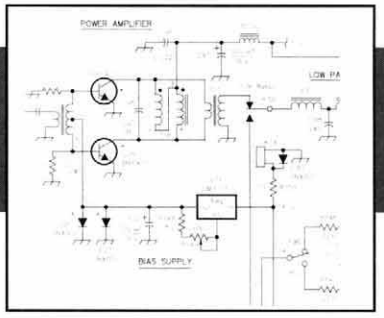

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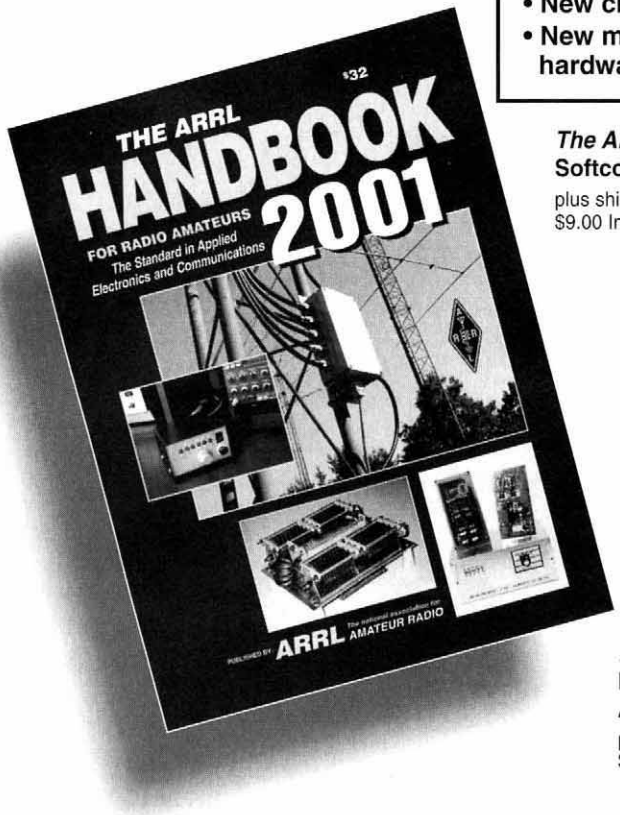

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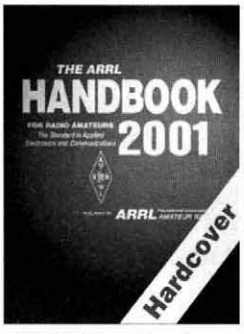

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Workshop on use of Emergency Power Systems with Photovoltaics, Learn how to solar power your HAM station and respond to disasters, April 5-6 and April 19-20, Florida Solar Energy Center, 1679 Clearlake Road, Cocoa, FL 32922. (321) 638-1443, www.fsec.ucf.edu/pvr/disas/ (two days with manual for $25.00). Bill Young, KA4VYH

YAESU Complete ham radio station in excellent condition. FT-301D 160 thru 10 meter HF transceiver, FP-301D AC Power Supply with clock and CW identifier, FV-301 External VFO, YO-301 Monitor Scope, FC-301 Antenna Tuner. (408) 736-0339 e-mail: scellato@ix.netcom.com

JOBS

Wanted: Amateur with primary school teaching experience (retired or not). Teaching in ham radio, math and all other sciences for children in Jeju Island, South Korea (IOTA, AS-026). Provide apartment and ham radio equipment. Contact Wonki Oh, WM2X E-Mail: HL4sf@hitel.net, (82)-(64)-796-9659, 0000-0800 UTC.

WANTED FOR SUMMER OF 2001: Instructors in electronics, ham radio, computers and all other sciences. Small boys' science camp in Pennsylvania. Apply: Donald Wacker, P.O. Box 356, Paupack, Pennsylvania 18451. 570-857-1401.

Wanted: part time installer, flexible hours to install Personal Emergency Response Systems. An average install takes 1 hour for which we pay $50.00 and $25.00 for a service call. Currently opportunities exist in Boston, Massachusetts, Dauphin County, Pennsylvania, Fairfax County, Virginia, and Santa Cruz, California. Great opportunity to earn extra money. Paid monthly. If interested, please email jh@lmrgroup.com. Visit our website at www.Link-to-Life.com.

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The ARRL Outgoing QSL Service

Note: The ARRL QSL Service should not be used to exchange QSL cards within the 48 contiguous states.

How To Use The ARRL Outgoing QSL Service

(1) Presort your DX QSLs alphabetically by parent call-sign prefix (AP, C6, CE, DL, ES, EZ, F, G, JA, LY, PY, UN, YL, 5N, 9Y and so on). Note that some countries have a parent prefix and use additional prefixes, ie, G (parent prefix) = M, 2E, 2I, 2M, 2W and so on. When sorting countries that have multiple prefixes, keep that country's prefixes grouped together in your alphabetical stack. Addresses are not required. *Do not* separate the country prefixes by use of paper clips, rubber bands, slips of paper or envelopes.

(2) Enclose proof of current ARRL membership. This can be in the form of a photocopy of the white address label from your current copy of *QST*. You can also write on a slip of paper the information from the label, and use that as proof of membership. A copy of your current membership card is also acceptable.

(3) Members (including foreign, QSL Managers, or managers for DXpeditions) should enclose payment of $4 for the first 1/2 pound of cards or portion thereof—approximately 75 cards weigh 1/2 pound. $8 for one pound, the fee rate then increases at the rate of $4 for each additional 1/2 pound (i.e. a package containing 1 1/2 pounds of cards should include the fee of $12 and so on). A package of only 10 cards or fewer sent in a *single* shipment costs only $1. Please pay by check (or money order) and write your call sign on the check. Send "green stamps" (cash) at your own risk. *Do not* send postage stamps or IRCs. (*DXCC credit cannot be used towards the QSL Service fee*.)

(4) Include only the cards, proof of membership, and fee in the package. Wrap the package securely and address it to the ARRL Outgoing QSL Service, 225 Main St, Newington, CT 06111-1494.

(5) Family members may also use the service by enclosing their QSLs with those of the primary member. Include the appropriate fee with each individual's cards and indicate "family membership" on the primary member's proof of membership.

(6) Visually impaired members who do not receive *QST* need only include the appropriate fee along with a note indicating the cards are from a blind member.

(7) ARRL affiliated-club stations may use the service when submitting club QSLs by indicating the club name. Club secretaries should check affiliation papers to ensure that affiliation is current. In addition to sending club station QSLs through this service, affiliated clubs may also "pool" their members' individual QSL cards to effect an even greater savings. Each club member using this service must also be a League member. Cards should be sorted "en masse" by prefix, and proof of membership enclosed for each ARRL member.

Recommended QSL Card Dimensions

The efficient operation of the worldwide system of QSL Bureau requires that cards be easy to handle and sort. Cards of unusual dimensions, either much larger or much smaller than normal, slow the work of the Bureaus, most of which is done by unpaid volunteers. A review of the cards received by the ARRL Outgoing QSL Service indicates that most fall in the following range: Height = 2 3/4 to 4 1/4 inches (70 to 110 mm), Width = 4 3/4 to 6 1/4 inches (120 to 160 mm). Cards in this range can be easily sorted, stacked and packaged. Cards outside this range create problems; in particular, the larger cards often cannot be handled without folding or otherwise damaging them. In the interest of efficient operation of the worldwide QSL Bureau system, it is recommended that cards entering the system be limited to the range of dimensions given. (Note: IARU Region 2 has suggested the following dimensions as optimum: Height 3 1/2 inches [90 mm], Width 5 1/2 inches [140 mm].)

Countries Not Served By The Outgoing QSL Service

Approximately 260 DXCC countries are served by the ARRL Outgoing QSL Service, as detailed in the ARRL DXCC Countries List. This includes nearly every active country. As noted previously, cards are forwarded from the ARRL Outgoing Service to a counterpart Bureau in each of these countries. In some cases, there is no Incoming Bureau in a particular country and cards therefore cannot be forwarded. However, QSL cards can be forwarded to a QSL manager, eg, ZB2FX via (G3RFX). The ARRL Outgoing Service cannot forward cards to the following countries:

A5	Bhutan	V6	Micronesia
A6	United Arab Emirates	VP2M	Montserrat
D2	Angola	XU	Kampuchea
J5	Guinea-Bissau	XW	Laos
KH0	Mariana Is.	XZ (1Z)	Myanmar (Burma)
KH1	Baker and Howland Is.	YA	Afghanistan
KH4	Midway I.	ZD9	Tristan da Cunha
KH5	Palmyra and Jarvis Is.	ZK1	North & South Cook
KH7K	Kure I.	3C0	Pagalu I.
KH8	American Samoa	3C	Equatorial Guinea
KH9	Wake I.	3W, XV	Vietnam
KP1	Navassa I.	3X	Guinea
KP5	Desecheo I.	5A	Libya
P5	North Korea	5R	Madagascar
S7	Seychelles	5T	Mauritania
SU	Egypt	5U	Niger
T2	Tuvalu	7O, 4W	Yemen
T3	Kiribati	7P	Lesotho
T5	Somalia	7Q	Malawi
T8	Palau	8Q	Maldives
TJ	Cameroon	9N	Nepal
TL	Central African Republic	9U	Burundi
TN	Congo	9X	Rwanda
TT	Chad		
TY	Benin		

Countries that currently restrict the forwarding of QSL cards to anyone other than members of that country's national society include the following:

Monaco	Germany	Japan
France	Poland	Portugal
Morocco		

Additional information:

- We no longer hold cards for countries with no Incoming Bureau. Only cards indicating a QSL manager for a station in these particular countries will be forwarded.
- When sending cards to *Foreign QSL Managers*, make sure to sort these cards using the Manager's call sign, rather than the station's call sign.
- SWL cards can be forwarded through the QSL Service.
- The Outgoing QSL Service **cannot** forward stamps, IRCs or "green stamps" (cash) to the foreign QSL bureaus.

Please direct any questions or comments to the ARRL Outgoing QSL Service, 225 Main St, Newington, CT 06111-1494. Inquires via e-mail may be sent to: **buro@arrl.org**.

Previous • Next Help Desk

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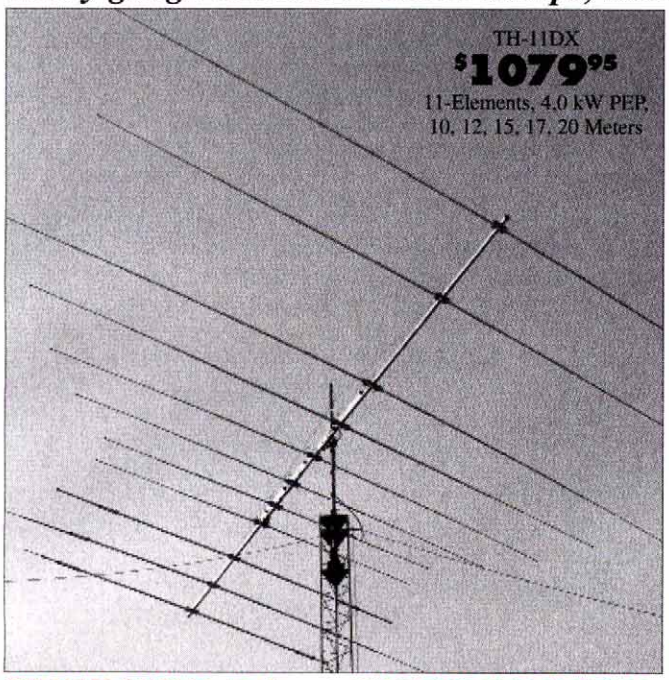

TH-11DX, $1079.95. 11-element, 4.0 kW PEP, 10,12,15,17,20M

The choice of top DXers.

With 11-elements, excellent gain and 5-bands, the super rugged TH-11DX is *the "Big Daddy" of all HF beams!*

Handles 2000 Watts continuous, 4000 Watts PEP.

Every part is selected for durability and ruggedness for years of trouble-free service.

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Stainless steel hardware and clamps are used on all electrical connections.

TH-7DX, $819.95. 7-element, 1.5 kW PEP, 10,15,20 Meters

7-Elements gives you the *highest average gain* of any Hy-Gain tri-bander!

Dual driven for broadband operation without compromising gain. SWR less than 2:1 on *all* bands.

Uniquely combining monoband and trapped parasitic elements give you an excellent F/B ratio.

Includes *Hy-Gain's* diecast aluminum, rugged boom-to-mast clamp, heavy gauge element-to-boom brackets, BN-86 balun. For high power, upgrade to BN-4000.

TH-5MK2, $699.95. 5-element, 1.5 kW PEP, 10,15,20 Meters

The broadband *five element* TH5-MK2 gives you outstanding gain.

Separate air dielectric *Hy-Q* traps let you adjust for maximum F/B ratio on each band.

Also standard is *Hy-Gain's* exclusive *BetaMATCH*™, stainless steel hardware and compression clamps and BN-86 balun.

TH-3MK4, $439.95. 3-element, 1.5 kW PEP, 10,15,20 Meters

The super popular TH-3MK4 gives you the *most gain for your money* in a full-power, full-size durable Hy-Gain tri-bander!

You get an impressive average gain and a whopping average front-to-back ratio. Handles a full 1500 Watts PEP. 95 MPH wind survival.

Fits on average size lot with room to spare -- turning radius is just 15.3 feet. Four piece boom is ideal for DXpeditions. Rotates with CD-45II or HAM-IV rotator.

Features *Hy-Gain BetaMatch*™ for DC ground, full power *Hy-Q*™ traps, rugged boom-to-mast bracket and mounts on standard 2"O.D. mast. Stainless steel hardware. BN-86 balun recommended.

TH-2MK3, $339.95. 2-element, 1.5 kW PEP, 10,15,20 Meters

The 2-element TH-2MK3 is Hy-Gain's *most economical* full power (1.5kW PEP) full size tri-bander.

For just $339.95 you can greatly increase your effective radiated power and hear far better!

Ruggedly constructed, top-performing, compact 6 foot boom, tight 14.3 foot turning radius. Installs almost anywhere. Rotate with CD-45II or HAM-IV. BN-86 balun recommened.

EXP-14, $549.95. 4-element, 1.5 kW PEP, 10,15,20 Meters

Revolutionary 4-element compact tri-bander *lets you add 40 or 30 Meters!* Has 14 foot boom and tight 17.25 feet turning radius. Fits on roof tri-pod, mast or medium duty tower.

Hy-Gain's *patented* broadbanding *Para Sleeve* gives you less than 2:1 VSWR. 1.5kW PEP.

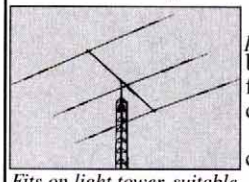
BetaMATCH™ provides DC ground to eliminate static. Includes BN-86 balun. Easily assembled.

Truly *competitive against giant tri-banders at half the cost!*

QK-710, $169.95. 30/40 Meter option kit for EXP-14.

Compact 3-element 10, 15, 20 Meter Tri-Bander

For limited space . . . Installs anywhere . . . 14.75 ft turning radius . . . weighs 21 lbs . . . Rotate with CD-45II, HAM-IV



Fits on light tower, suitable guyed TV pole, roof tri-pod

TH-3JRS, $329.95. Hy-Gain's *most popular* 3-element 10, 15, 20 Meter tri-bander fits on most lots! Same top performance as the full power TH3MK4 in a compact 600 watt PEP design.

Excellent gain and F/B ratio let *you* compete with the "big guns".

Tooled manufacturing gives you *Hy-Gain* durability with 80 MPH wind survival.

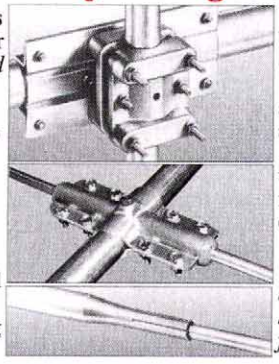
Model No.	No. of elements	avg Gain dBd	avg F/B dB	MaxPwr watts PEP	Bands Covered	Wind sq.ft. area	Wind (mph) Survival	Boom (feet)	Longest Elem. (ft)	Turning radius(ft)	Weight (lbs.)	Mast dia O.D.(in.)	Recom. Rotator	Retail Price
TH-11DX	11	*For Gain and F/B ratio--See...*		4000	10,12,15,17,20	12.5	100	24	37	22	88	1.9-2.5	T2X	$1079.95
TH-7DX	**7**			**1500**	**10, 15, 20**	**9.4**	**100**	**24**	**31**	**20**	**75**	**1.5-2.5**	**HAM-IV**	**$819.95**
TH-5MK2	5	• www.hy-gain.com		1500	10, 15, 20	7.4	100	19	31.5	18.42	57	1.5-2.5	HAM-IV	$699.95
TH-3MK4	**3**	• Hy-Gain catalog		**1500**	**10, 15, 20**	**4.6**	**95**	**14**	**27.42**	**15.33**	**35**	**1.9-2.5**	**CD-45II**	**$439.95**
TH-3JRS	3	• Call toll-free		600	10, 15, 20	3.35	80	12	27.25	14.75	21	1.25-2.0	CD-45II	$329.95
TH-2MK3	**2**	800-973-6572		**1500**	**10, 15, 20**	**3.25**	**80**	**6**	**27.3**	**14.25**	**20**	**1.9-2.5**	**CD-45II**	**$339.95**
EXP-14	4			1500	10,15,20 w/10-80	7.5	100	14	31.5	17.25	45	1.9-2.5	HAM IV	$549.95

Tooled Manufacturing . . . Highest Quality Materials

1. Hy-Gain's famous super strong *tooled* die cast *Boom-to-Mast Clamp*

2. ***Tooled*** *Boom-to-Element Clamp*

3. Thick-wall *swaged* aluminum tubing



Tooled *manufacturing* is the difference between Hy-Gain antennas and the others -- they just don't have it (it's expensive!).

Die-cast aluminum boom-to-mast bracket and element-to-boom compression clamps are made with specially *tooled* machinery.

Hy-Gain antennas feature *tooled* swaged tubing that is easily and securedly clamped in place. All tubing is deburred and cleaned for smooth and easy assembly.

Durable precision injection molded parts.

Hy-Gain *antennas are stronger, lighter, have less wind surface area, better wind survival, need no adjustments, look professional and last years longer.*

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The ARRL Incoming QSL Bureau System

Within the US and Canada, the ARRL DX QSL Bureau System is made up of numerous call area bureaus that act as central clearing houses for QSLs arriving from foreign countries. These "incoming" bureaus are staffed by volunteers. The service is currently free and ARRL membership is not required, although operating costs are funded from ARRL membership dues. That's why we welcome your support as an ARRL Member.

How it Works

Most countries have "outgoing" QSL bureaus that operate in much the same manner as the ARRL Outgoing QSL Service. The member sends his cards to his outgoing bureau where they are packaged and shipped to the appropriate countries.

A majority of the DX QSLs are shipped directly to the individual incoming bureaus where volunteers sort the incoming QSLs by the first letter of the call sign suffix. One individual may be assigned the responsibility of handling from one or more letters of the alphabet. All Incoming QSL Bureaus have e-mail addresses. Some bureaus have active Web pages. Please send an e-mail to **buro@arrl.org** for the e-mail address or URL of your Bureau.

Claiming your QSLs

Send a $5 \times 7^1/_2$ or 6×9-inch self-addressed, stamped envelope (SASE) or money credit where applicable to the bureau serving your call sign district. Neatly print your callsign in the upper left corner of the envelope. Place your mailing address on the front of the envelope. A suggested way to send envelopes is to affix a first class stamp and clip extra postage to the envelope. Then, if you receive more than 1 oz of cards, they can be sent in the single package.

Some incoming bureaus sell envelopes or postage credits in addition to the normal SASE handling. They provide the proper envelope and postage upon the prepayment of a certain fee. The exact arrangements can be obtained by sending your inquiry with a SASE to your area bureau. A list of these bureaus appears below.

Helpful Hints

Good cooperation between the DXer and the bureau is important to ensure a smooth flow of cards. Remember that the people who work in the area bureaus are volunteers. They are providing you with a valuable service. With that thought in mind, please pay close attention to the following DOs and DON'Ts:

DOs

- DO keep self-addressed $5 \times 7^1/_2$ or 6×9-inch envelopes or money credits on file at your bureau, with your call in the upper left corner, and affix at least one unit of first-class postage.
- DO send the bureau enough postage to cover SASEs on file and enough to take care of possible postage rate increases.
- DO respond quickly to any bureau request for SASEs, stamps or money. Unclaimed card backlogs are the bureaus' biggest problem.
- DO notify the bureau of your new call as you upgrade. Please send SASEs with your new call, in addition to SASEs with your old call.
- DO include a SASE with any information request to the bureau.
- DO notify the bureau in writing if you don't want your cards.
- DO notify your bureau of a change in address.

DON'Ts

- DON'T send domestic US-to-US cards to the various call-area bureaus.
- DON'T expect DX cards to arrive for several months after the QSO. Overseas delivery is very slow. Many cards coming from overseas bureaus are over a year old.
- DON'T send your outgoing DX cards to your call-area bureau.
- DON'T send SASEs to your "portable" bureau. For example, WB8IMY/1 sends SASEs to the W8 bureau, not the W1 bureau.
- DON'T send SASEs or money credits to the ARRL Outgoing QSL Service.
- Don't send SASEs larger than 6×9 inches. SASEs larger than this require additional postage surcharges.

ARRL INCOMING DX QSL BUREAU ADDRESSES

First Call Area: All calls[1,3]
W1 QSL Bureau
PO Box 7388
Milford, MA 01757-7388

Second Call Area: All calls[1,3]
ARRL 2nd Dist QSL Bureau
NJDXA
PO Box 599
Morris Plains, NJ 07950

Third Call Area: All calls
Pennsylvania DX Association
PO Box 100
York Haven, PA 17370-0100

Fourth Call Area: All single-letter prefixes (K4, N4, W4)
Mecklenburg ARC
PO Box DX
Charlotte, NC 28220

Fourth Call Area: All two-letter prefixes (AA4, KB4, NC4, WD4, etc)
Sterling Park ARC
Call Box 599
Sterling, VA 20167

Fifth Call Area: All calls[1]
W5 Incoming QSL Bureau
Magnolia DX Assn
PO Box 999
Wiggins, MS 39577-0999

Sixth Call Area: All calls[1,2]
ARRL Sixth (6th) District DX
QSL Bureau
PO Box 900069
San Diego, CA, 92190-0069

Seventh Call Area: All calls[1]
Willamette Valley DXC Inc
PO Box 555
Portland, OR 97207

Eighth Call Area: All calls
8th Area QSL Bureau
PO Box 182165
Columbus, OH 43218-2165

Ninth Call Area: All calls[1]
Northern Illinois DX Assn
W9 Incoming QSL Bureau
PO Box 273
Glenview, IL, 60025-0273

Tenth Call Area: All calls[1]
Ø QSL Bureau
PO Box 4798
Overland Park, KS 66204

Puerto Rico: All calls[1]
Puerto Rico QSL Bureau
PO Box 9021061
San Juan, PR 00902-1061

US Virgin Islands: All calls
Virgin Islands ARC
GPO Box 11360
Charlotte, Amalie
Virgin Islands 00801

Hawaiian Islands: All calls[1]
Wayne Jones, NH6K
PO Box 860778
Wahiawa, HI 96786

Alaska: All calls[1]
Alaska QSL Bureau
PO Box 520343
Big Lake, AK 99652

SWL:
Mike Witkowski, WDX9JFT
4206 Nebel St
Stevens Point, WI 54481

QSL Cards for Canada may be sent to:
RAC Incoming QSL Bureau
Box 51
St John, NB E2L 3X1

QSL cards for Canada may also be sent to the individual bureaus:

VE1, VEØ,[1]
Brit Fader Memorial QSL Bureau
Box 8895
Halifax, NS B3K 5M5

VE2
Jacques Dube, VE2QK
875 St Severe St
Trois-Rivieres, QC G9A 4G4

VE3
The Ontario Trilliums
Box 157
Downsview, ON M3M 3A3

VE4
Adam Romanchuk, VE4SN
26 Morrison St
Winnipeg, MB R2V 3B4

VE5[1]
Bjarne Madsen, VE5FX
Box 2860
Tisdale, SK S0E 1T0

VE6[1]
Neil Jensen, VE6NRJ
EPO Box 57205
Sherwood Park, AB T8A 5L7

VE7[1]
Dennis Livesey, VE7DK
8309 112th St
Delta, BC V4C 4W7

VE8[1]
Rolf Ziemann, VE8RZ
2 Taylor Rd
Yellowknife, NWT X1A 2K9

VE9, VY2
VE9, VY2 QSL Bureau
Box 12-255
1633 Mountain Rd
Moncton, NB E1G 1A5

VO1, VO2
Rick Burke, VO1SA
Box 23099
St John's, NF A1B 4J9

VY1
Hugh Henderson, VY1HH
PO 33062
Whitehorse, YT Y1A 5Y5

Notes
[1]These bureaus sell envelopes or postage credits. Send an SASE to the bureau for further information.
[2]These bureaus can only accept specific sized envelopes. Send an SASE to the bureau for further information.
[3]These bureaus will not accept SASEs. Send money credits only.

Previous Help Desk

Official ARRL Sportswear

Show off your ARRL Membership!

Identify your involvement in Amateur Radio!

Twill Cap
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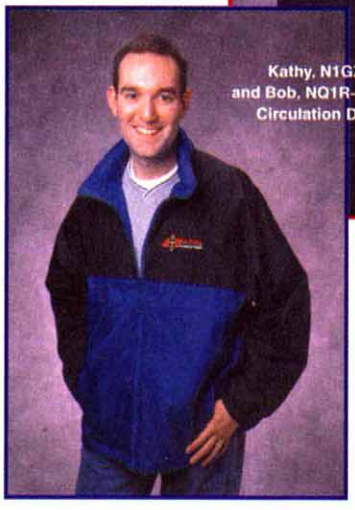
Khaki, one size fits most: **$10**



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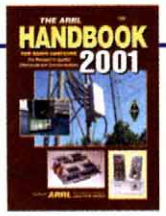

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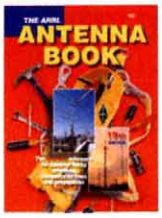

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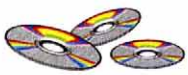

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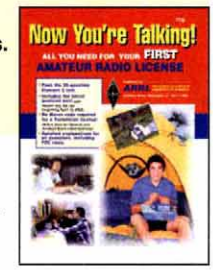

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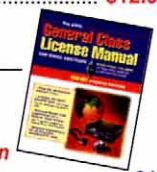

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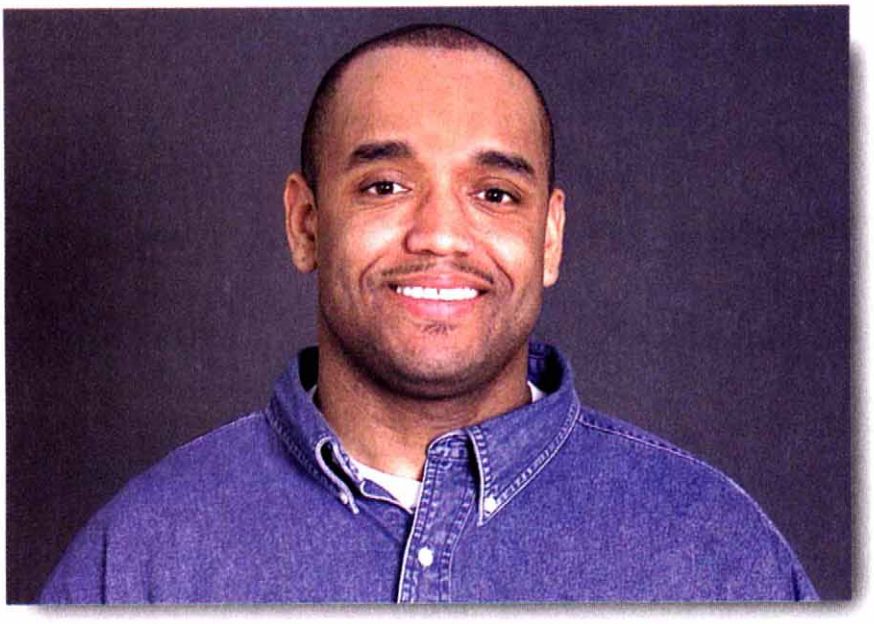

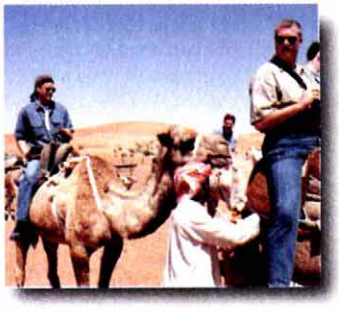

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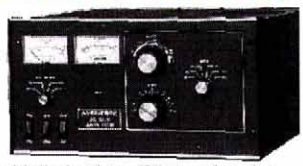

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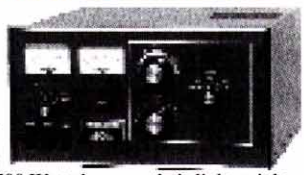

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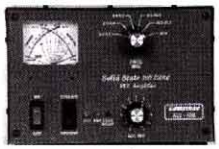

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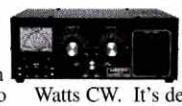

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May Issue Focus:	VHF/UHF Microwave Dayton	Deadline: March 20 , 2001
June Issue Focus:	Field Day	Deadline: April 17 , 2001

SAVE BIG ON ANTENNAS, TOWERS & CABLE

TELESCOPING ALUMINUM TUBING

DRAWN 6063-T832

.375	$.70/ft	1.250"	$1.55/ft
.500"	$.80/ft	1.375"	$1.75/ft
.625"	$.90/ft	1.500"	$1.95/ft
.750"	$1.00/ft	1.625"	$2.25/ft
.875"	$1.10/ft	1.750"	$2.50/ft
1.000"	$1.20/ft	1.875"	$2.75/ft
1.125"	$1.35/ft	2.000"	$3.00/ft
		2.125"	$3.50/ft

In 6' or 12' lengths, 6' lengths ship UPS. Call for 3/16"& 1/4" rod, bar stock, and extruded tubing.

CUSHCRAFT ANTENNAS

X7/X740	$679/229
XM240	$719
R6000/R8	$319/469
A50-3S/5S/6S	$95/159/259
AR2/ARX2B	$49/69
AR270/AR270B	$85/99
ARX270N/ARX-450B	$219/65
13B2/17B2	$139/249
26B2	$389
A270-6S/A270-10S	$75/99

Please call for more Cushcraft items

FORCE 12–MULTIBAND

C3	10/12/15/17/20m, 7 el	$599
C3E	10/12/15/17/20m, 8 el	$649
C3S	10/12/15/17/20m, 6 el	$539
C3SS	10/12/15/17/20m, 6 el	$559
C4	10/12/15/17/20/40m, 8 el	$759
C4S	10/12/15/17/20/40m, 7 el	$679
C4SXL	10/12/15/17/20/40m, 8 el	$979
C4XL	10/12/15/17/20/40m, 9 el	$1119
C19XR	10/15/20m, 11 el	$959
C31XR	10/15/20m, 14 el	$1299

Please call for more Force 12 items

TRYLON "TITAN" TOWERS

SELF-SUPPORTING STEEL TOWERS

T200-64	64', 15 square feet	$1099
T200-72	72', 15 square feet	$1299
T200-80	80', 15 square feet	$1499
T200-88	88', 15 square feet	$1769
T200-96	96', 15 square feet	$2049
T300-88	88', 22 square feet	$1989
T400-80	80', 34 square feet	$1939
T500-72	72', 45 square feet	$1879
T600-64	64', 60 square feet	$1799

Many more Trylon towers in stock!

BENCHER / BUTTERNUT

Skyhawk, Triband Beam	$1129
HF2V, 2 Band Vertical	$219
HF5B, 5 Band Minibeam	$429
HF6VX, 6 Band Vertical	$299
HF9VX, 9 Band Vertical	$349
A1712, 12/17m Kit	$54
CPK, Counterpoise Kit	$129
RMKII, Roof Mount Kit	$159
STRII, Roof Radial Kit	$125
TBR160S, 160m Kit	$119

More Bencher/Butternut–call

M2 VHF/UHF ANTENNAS

144–148 MHz

2M4/2M7/2M9	$89/109/119
2M12/2M5WL	$149/189
2M5-440XP, 2m/70cm	$159

420–450 MHz

440-470-5W/420-450-11	$129/89
432-9WL/432-13WL	$169/219
440-18/440-21ATV	$119/139

Satellite Antennas

2MCP14/2MCP22	$169/219
436CP30/436CP42UG	$219/259

ROHN TOWER

25G/45G/55G	$89/189/239
AS25G/AS455G	$39/89
GA25GD/45/55	$68/89/115
GAR30/GAS604	$35/24
SB25G/45/55	$39/89/109
TB3/TB4	$85/99
HBX32/HBX40	$349/439
HBX48/HBX56	$589/699
HDBX40/HDBX48	$549/699
BXB5/6/7-8	$39/49/59/59

Please call for more Rohn prices

US TOWER

MA40/MA550	$849/1399
MA770/MA850	$2359/3729
TMM433SS/HD	$1139/1379
TMM541SS	$1499
TX438/TX455	$1069/1599
TX472/TX489	$2649/4599
HDX538/HDX555	$1379/2399
HDX572MDPL	$6329

Please call for help selecting a US Tower for your needs. Shipped factory direct to save you money!

COMET ANTENNAS

GP15, 6m/2m/70cm Vertical	$149
GP6, 2m/70cm Vertical	$139
GP9, 2m/70cm Vertical	$179
B10NMO, 2m/70cm Mobile	$36
B20NMO, 2m/70cm Mobile	$49
SBB2NMO, 2m/70cm Mobile	$39
SBB5NMO, 2m/70cm Mobile	$49
SBB7NMO, 2m/70cm Mobile	$75
Z750, 2m/70cm Mobile	$55
Z780, 2m/70cm Mobile	$69

Much more Comet in stock–call

M2 ANTENNAS

50–54 MHz

6M5X/6M7JHV	$199/239
6M2WLC/6M2.5WLC	$419/449

10/12/15/17/20m HF

10M4DX, 4 Element 10m	$379
12M4DX, 4 Element 12m	$379
15M4DX, 4 Element 15m	$419
17M3DX, 3 Element 17m	$379
20M4DX, 4 Element 20m	$499

More M2 models in stock–please call

GLEN MARTIN ENGINEERING

Hazer Elevators for 25G

H2, Aluminum Hazer, 12 sq ft	$359
H3, Aluminum Hazer, 8 sq ft	$269
H4, HD Steel Hazer, 16 sq ft	$339

Aluminum Roof Towers

RT424, 4 Foot, 6 sq ft	$159
RT832, 8 Foot, 8 sq ft	$229
RT936, 9 Foot, 18 sq ft	$389
RT1832, 17 Foot, 12 sq ft	$499

Please call for Glen Martin info

UNIVERSAL ALUMINUM TOWERS

4-40'/50'/60'	$519/739/1049
7-50'/60'/70'	$939/1369/1789
9-40'/50'/60'	$729/1049/1469
12-30'/40'	$559/869
15-40'/50'	$969/1399
23-30'/40'	$869/1289
35-30'/40'	$979/1509

Bold in part number shows wind-load capacity. Please call for more Universal models. All are shipped factory direct to save you money!

DIAMOND ANTENNAS

D130J/DPGH62	$79/139
F22A/F23A	$89/119
NR72BNMO/NR73BNMO	$39/54
NR770HBNMO/NR770RA	$55/49
X200A/X3200A	$129/210
X500HNA/700HNA	$229/369
X510MA/510NA	$189/189
X50A/V2000A	$99/149
CR627B/SG2000HD	$99/79
SG7500NMO/SG7900A	$75/112

More Diamond antennas in stock

MFJ ANTENNAS

259B, Antenna Analyzer	$219
269, Antenna Analyzer	$299
941E, 300W Antenna Tuner	$109
945E, 300W Antenna Tuner	$99
949E, 300W Antenna Tuner	$139
969, 300W Antenna Tuner	$169
986, 3kW Antenna Tuner	$289
989C, 3 kW Antenna Tuner	$309
1796, 40/20/15/10/6/2m Vert.	$189
1798, 80–2m Vertical	$249

Big MFJ inventory–please call

COAX CABLE

RG-213/U, (#8267 Equiv.)	$.36/ft
RG-8X, Mini RG-8 Foam	$.19/ft
RG-213/U Jumpers	Please Call
RG-8X Jumpers	Please Call

Please call for more coax/connectors

TIMES MICROWAVE LMR® COAX

LMR-400	$.59/ft
LMR-400 Ultraflex	$.89/ft
LMR-600	$1.19/ft
LMR600 Ultraflex	$1.95/ft

TOWER HARDWARE

3/8"EE / EJ Turnbuckle	$11/12
1/2"x9"EE / EJ Turnbuckle	$16/17
1/2"x12"EE / EJ Turnbuckle	$18/19
3/16" / 1/4" Preformed Grips	$5/6

Please call for more hardware items

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5 FTx .12" / .18"	$45/75
10 FT x .12" / 10 FT x .18"	$75/125
15 FT x .12" / 15 FT x .18"	$105/175
20 FT x .12" / 20 FT x .18"	$135/225
10 FT x .25" / 20 FT x .25"	$175/335

GAP ANTENNAS

Challenger DX	$289
Challenger Counterpoise	$29
Challenger Guy Kit	$19
Eagle DX	$299
Titan DX	$329
Eagle/Titan Guy Kit	$29
Voyager DX	$409
Voyager Counterpoise	$49
Voyager Guy Kit	$45
Quicktilt Mount	$75

Please Call for Delivery Information

LAKEVIEW HAMSTICKS

9106 ... 6m	9115 ... 15m	9130 ... 30m
9110 ... 10m	9117 ... 17m	9140 ... 40m
9112 ... 12m	9120 ... 20m	9175 ... 75m

All handle 600W, 7' approximate length, 2:1 typical VSWR ... $24.95

HUSTLER ANTENNAS

4BTV/5BTV/6BTV	$149/189/209
G6-270R, 2m/70cm Vertical	$169
G6-144B/G7-144B	$129/179

Hustler Resonators in stock–call

ANTENNA ROTATORS

M2 OR-2800PDC	$1099
Yaesu G-450A	$249
Yaesu G-800SA/DXA	$329/409
Yaesu G-1000DXA	$499
Yaesu G-2800SDX	$1089
Yaesu G-550/G-5500	$299/599

ROTATOR CABLE

R61 (#20)/R62 (#18)	$.28/32
R81/R82	$.25/.39
R83/R84	$.52/.85

PHILYSTRAN GUY CABLE

HPTG1200I	$.45/ft
HPTG2100I	$.59/ft
PLP2738 Big Grip (2100)	$6.00
HPTG4000I	$.89/ft
PLP2739 Big Grip (4000)	$8.50
HPTG6700I	$1.29/ft
PLP2755 Big Grip (6700)	$12.00
HPTG11200	$1.69/ft
PLP2558 Big Grip (11200)	$18.00

Please call for more info or help selecting the Phillystran size you need.

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IC-775 DSP.. New Lower Price!

The Icom IC-775DSP is a competition class HF transceiver featuring 200 watt RF output, digital signal processing, automatic antenna tuner, true dual RX, CW memory keyer, CTCSS tone encode, twin pass band tuning, dual antenna inputs, 101 memory chanels, built-in power supply, and much more. Supplied with AC power cord.

PW-1 ..... New Lower Price!

The Icom PW-1 is a 1000 watt solid state linear amplifier for HF and 6m operation, featuring a high power automatic antenna tuner, built-in power supply, and a removable front control panel, and more.

IC-746 ..... Icom Special!

The Icom IC-746 is an all mode transceiver covering HF/6m/2m. The radio features digital signal processing, 100 watt RF output on all bands, twin PBT, a 4.9"multifunction LCD display with band scope, automatic antenna tuner, and more. Supplied with a hand mic and DC power cord.

IC-756 PRO ..... New!

The Icom IC-756 PRO is an all mode HF/6m transceiver featuring DSP, automatic antenna tuner, 100 watts RF output, digital twin PBT, a 5" multifunction LCD display with band scope function, and more. Supplied with hand mic and DC power cord.

FT-1000MP MARK-V ..... New!

Competition class HF transceiver with DSP, auto tuner, 200W output, and more!

FT-1000D ..... In Stock!

Great competition class HF XCVR with dual RX, auto tuner, and 200W output.

FT-920 ..... Yaesu Special!

Nice all mode HF/6m transceiver with DSP, automatic tuner, and more.

Quadra System ... Lower Price!

Solid state 1 kW amplifier with auto tuner. No-tune HF and 6moperation!

FT-847 ..... Yaesu Special!

The Yaesu FT-847 is an all mode transceiver covering HF/6m/2m/70cm! The radio is perfect for satellite operation. Features digital signal processing, built-in RS-232 interface, built-in CTCSS tone encode/decode module, optional ATAS-100 mobile screwdriver type antenna, and more. Supplied with an up/down hand mic and DC power cord.

FT-840 ..... Great Low Price!

Great entry level HF XCVR featuring built-in CTCSS tone encode, noise blanker, IF shift, 100 memories and more. With hand mic and DC power cord.

IC-706MK2G ..... Icom Special!

The Icom IC-706MK2G is a compact HF/6m/2m/70cm all mode transceiver with digital signal processing, automatic repeater offset, built-in CW keyer, built-in CTCSS tone encode/decode/scan, 107 memory channels and more. A detachable front panel offers convenient mounting, even in compact vehicles.

IC-718 ..... Great Low Price!

The Icom IC-718 is an all mode HF transceiver featuring a front panel mounted speaker, IF shift, optional DSP module, multiple scanning modes, noise blanker, RIT, and more.

IC-2800H..... Icom Special!

The Icom IC-2800H is a 2m/70cm dual band mobile FM transceiver with a 3" color TFT display. The radio features a separate control face, video input, bandscope display, 9600 bps Packet jack, CTCSS tone encode/decode/scan, 232 memories, cross band duplex, and more. With DTMF hand mic, mounting brackets, and power cord.

IC-910H ..... New, In Stock!

The IC-910H is a dual band 2m/70cm all mode XCVR with true dual band operation, featuring dual data jacks, optional 23cm band module, optional DSP, and more.

FT-90R ..... New!

Ultracompact 2m/70cm mobile XCVR with removeable face, extended RX, and more.

FT-7100M..... New, Please Call!

Great 2m/70cm dual band mobile, 45/35 Watts, removable front panel, and more!

FT-1500M... New Lower Price!

Tiny 2m mobile XCVR with 50W output.

FT-2600M..... New, Please Call!

Rugged 2m mobile with intermod free RX.

FT-100D ..... New!

Ultra-compact all mode XCVR for HF/6m/2m/70cm. Features DSP, CW keyer, tone encode/decode, 200 memories, VOX, and more. Supplied with a DTMF hand mic, power cord and mounting bracket.

FT-817 ..... Now In Stock!

A truly tiny self-contained all mode HF/6m/2m/70cm QRP XCVR featuring DSP, tone encode/decode, 200 memories, VOX, and more! Supplied with a hand mic, DC power cord and duck antenna.

IC-W32A ..... New Lower Price!
IC-Q7A ..... Icom Special!
IC-T7H ..... Icom Special!
IC-T81A ..... Quad Band HT!
IC-T82A ..... New Tri Band HT!
IC-T2H ..... Amazing Low Price!

IC-207H ..... Great Low Price!

Great 2m/70cm dual band mobile XCVR with CTCSS tone encode/decode, 182 memories, removable face, and more.

IC-2100H ..... Icom Special!

Rugged 2m mobile XCVR at a great price.

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IC-R2 ..... In Stock!
IC-R3 ..... Video RX, In Stock!
IC-R10 ..... Icom Special!

G-2800SDX $1089

Heavy duty antenna rotator handles 34 sq. ft. of antenna load, and features 450° rotation, preset and variable speed.

G-1000DXA $499
G-800SA/DXA $329/409
G-450A $249
G-5500 ..... $599
G-550 ..... $299

VX-5R ..... Now In Stock!

Tiny 6m/2m/70cm HT, with CTCSS tone encode/decode/scan, long life Lithium-Ion battery pack, extended RX, and more.

FT-50RD ..... In Stock!
VX-1R ..... Please Call!
VX-150 ..... New, In Stock!

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A New Dual-Band Engineering Milestone:

Introducing the Dual Band Mobile for the 21st Century's Active Ham!

The Yaesu Engineering Team has done it again! The exciting new FT-7100M Dual Band Mobile brings you the ruggedness and operating ease of our single-band mobiles, and the convenience of remote-head mounting capability (optional YSK-7100 Separation Kit required), in an all-new 144/430 MHz Dual Band design!

Providing 50 Watts of power output on 2 meters, and 35 Watts on 70 cm, the FT-7100M has power to spare when you're in a fringe area. For repeater access or selective simplex calling, you get built-in encoder-decoder circuits providing 50 CTCSS tones and 104 DCS (Digital Code Squelch) codes. And the FT-7100M's huge 262-channel Memory System lets you store up to six Alpha-Numeric characters, for easy channel identification.

Operation of the FT-7100M is simple and straightforward, with separate Volume and Squelch controls for each band during dual-band reception, and eight single-function front panel keys provide the easy feature access you need during mobile operation. What's more, you also get three user-definable keys on the microphone to use for important control functions.

Rugged, reliable, and versatile, the FT-7100M provides the highest cost-performance available among Dual Band FM Mobiles. See your Yaesu Dealer today for a test drive!

144/430 MHz FM Dual Band Mobile Transceiver

FT-7100M

FEATURES

- Frequency Range: TX 144-148, 430-450 MHz RX 108-137 MHz (AM), 137-180 MHz, 320-480 MHz, 810-999.99 MHz (Cellular blocked)
- VHF/UHF, VHF/VHF, and UHF/UHF Dual Receive operation*
- Channel Steps: 5/10/12.5/15/20/25/50 kHz/step
- Power Output: 50 Watts (144 MHz) 35 Watts (430 MHz)
- Power Amplifier Type: 2SK3478 Power MOS FET
- Efficient Cooling System: Direct-flow heat-sink and thermostatically-controlled fan
- 262 Memory Channels: 120 "regular" memories, 5 pairs of band limit memories, and one "HOME" channel on each band
- Alpha-Numeric Memory Labels: 6 Characters on lower display field, 5 Characters on upper
- Smart Search™ Automatic Memory Loading System
- 50 CTCSS Encode/Decode Tones
- 104 DCS Encode/Decode Codes
- CTCSS and DCS Search
- ARTS™ (Auto-Range Transponder System)
- Automatic Repeater Shift (ARS)
- DTMF Microphone (U.S. version): Includes 16-memory Auto-dialer, and Direct Frequency Entry
- Band Scanning, Band-Limit Scanning, and Memory Scanning
- Three Priority Channel Modes: VFO, Memory, and Home Channel Priority
- RF Squelch: Opens at user-defined signal level
- Tx Time-Out Timer (TOT)
- Automatic Power-Off (APO)
- 1200/9600 bps Packet Compatible
- Battery Voltage Meter
- Compact Size: 5.8" x 1.9" x 6.9" WHD
- Large (0.9" x 2.3") Liquid Crystal Display
- Cloning Capability: To other FT-7100M Transceivers
- Optional YSK-7100 Separation Kit
- Optional CT-39A Packet Cable

*Simultaneous reception on two different Frequencies, in-band or Cross-Band. Cross-band Repeater Function not available.

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TS-B2000 PC or Mobile Unit

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The All New TS-2000 Multi Band/Multi Mode Transceiver

RC-2000 Compact Mobile Head

The all new Kenwood **TS-2000** series transceiver offers today's demanding Amateur operator high performance operation without the compromising limitations found in other similar multi-band, multi-mode transceivers. The **TS-2000** offers three distinct operation platforms, the traditional transceiver with full function front panel, or the high-tech looking "silver box" version that allows mobile operation with the new **RC-2000** compact control head, or the ARCP-2000 computer control program making the **TS-B2000** functional from your personal computer. The new **TS-2000** offers 100 watts on HF, 6 meters and 2 meters, 50 watts on 70cm. **TS-2000X** will also include 1.2GHz. (available March 2001) You will be happy to know the **TS-2000** is transverter frequency display function ready to work the latest satellite frequencies available.

IF stage DSP in the main band and AF stage DSP in the sub-band provide unparalleled noise reduction performance. Because the **TS-2000** has a built-in TNC, DX Packet Cluster Tune is available on the sub-band and can automatically shift the desired HF or 6 Meter frequencies direct to the main band for instant contacts. A DXer's dream come true. You will also be sure to enjoy the built-in antenna tuner, 5+1 antenna ports, RS-232 terminal and the world's first HF fully backlighted front control panel.

The **TS-2000** multi-band multi-mode transceiver, the highest performance Amateur Radio ever produced. **Available now.**

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